

MOTOR AGE

Vol. XLII
Number 7

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CHICAGO, AUGUST 17, 1922

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Three Dollars a Year

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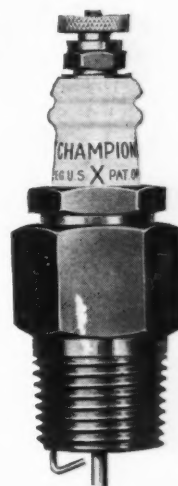
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CHAMPION DEPENDABLE SPARK PLUGS

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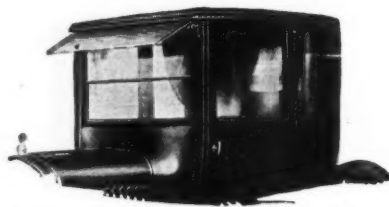
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THIS is one of the most important announcements we've ever been privileged to make to dealers and car owners, because it offers to America's 5,000,000 Ford owners a Visor of the same fine workmanship and practical utility as the standard Sunbeam Visor—the Sunbeam Junior.

The Sunbeam Junior is our response to an insistent demand from dealers, jobbers and Ford owners who have seen or sold the standard Sunbeam Visor.



*Showing Sunbeam Junior Visor
for Closed Fords*

This is absolutely the only high-grade Vistor on the market for Ford cars, quality built throughout, sturdy and durable, equipped with genuine Thoma Process quarter-inch ribbed glass—GREEN and AMBER.

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This is a real opportunity for every dealer — tremendous sales possibilities, quick turnover, a satisfactory profit in every sale, and a remarkably low retail price of only **\$8.00**

West of Rockies, \$10.00.

Standard Package, six to the case. Order a case from your jobber. Write factory direct for advertising helps.

Manufactured by

THOMAS & SON-INC.
Everything in
Glass for the Automobile
Fairfield, Iowa

MOTOR AGE

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Makes a Very Handsome Auto Top

The new pebble grain finish has a lustre and substantial appearance that makes it stand out with an individuality and distinctiveness above regular top materials.

The Pride of Possession

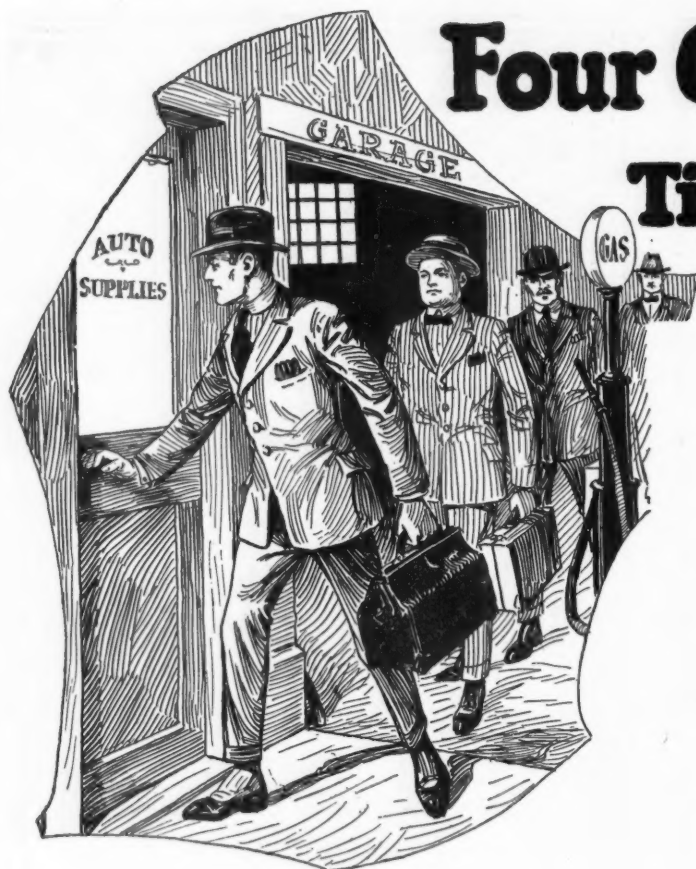
If your top looks well your whole car carries a certain dignity and attractiveness that an ordinary top will never convey. Years of practical experience are back of IDEAL DRIDEK and we emphatically state that this new pebble grain on our particular fabrics make an auto top that is without competition.

Experts Are Strong in Praise of Ideal Dridek

We solicit trial orders from manufacturers and jobbers.

L. J. MUTTY COMPANY

Boston, Dept. C Mass.



Four Order-Hounds and the Timer-Wise Dealer

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T. W. Dealer: "Put me down for a dumb-bell. I bought some of 'em last Spring. Can't give 'em away."

O. H. No. 2: "Lemme show you the Not-a-Miss Timer. It's going to sweep the country."

T. W. Dealer: "Let 'er sweep. The only dust I'm after is gold dust."

O. H. No. 3: "We're pushing our Tinco Timer. Wait till you see our advertising."

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Get Timer-Wise!

Concentrate on the best known timer —because it's easiest to sell! Your trade knows the Milwaukee. Why waste time "explaining" some timer they never heard of? Milwaukee Timer advertising is working for YOU all the time. Hook up to it! How's your Milwaukee stock now?

Then Salesman No. 4 came in, representing a good Jobbing House. The Timer-Wise Dealer re-ordered *Milwaukee Timers*, gave No. 4 a Good Cigar, and went back behind the counter again, to his quick Turn-overs and Satisfied Customers.

Milwaukee Motor Products, Inc.
MILWAUKEE, WISCONSIN



MILWAUKEE TIMER for FORDS

\$2.00 at auto
supply and
hardware stores
and garages

Attractive Steel Display
Stand sent free, postpaid, on
request. Write for yours.

MOTOR AGE



There Is a Complete Automotive Line—Why Not Sell It?

Too Many Merchants Have Confined Themselves to a Few Articles and Profits Have Suffered

By CLYDE JENNINGS

WHAT shall I sell, is a natural question for the automotive merchant to ask. Automotive merchandising is such a new business that its lines have not defined themselves sharply. But as far as that is concerned, no two stores in any other line of trade sell exactly the same lines. Most merchants are in business primarily to make money and they are very apt to sell those things which will pay them the best return for the investment, time and trouble required to sell them.

The automotive merchant has been too much inclined to make himself a specialist. Specialized merchandising is an attractive business but it requires a heavy overhead and a strong selling effort. Also most specialized businesses must be socialized to make them an entire success.

Originally the automotive merchant regarded the vehicle as his article of sale and many pioneer dealers refused to sell anything else, even to equipment for the vehicle that he sold. Gradually this feeling has been overcome until today the dealer



who sells nothing but vehicles is in the great minority. In the early day, some vehicle dealers even attempted to farm out their maintenance departments, but this idea soon was dropped. Then the idea of giving away maintenance was started but in the main was also dropped. Today some dealers, and even some factories apparently, believe that they can give liberally of maintenance, but most dealers have reached the sound principle that they must give away nothing that costs them something. This does not, of course, imply when a dealer sells a car that he should not replace defective parts or make good any production defects.

The guide to the dealer should be that he is a transportation dealer and that he should sell those articles of merchandise which make for better automotive transportation and on which he can make a profit. Most of these he can sell without increasing his overhead. What do you think of a list like this:

Automotive vehicles.
Maintenance.
Special equipment.
General equipment.
Tires.
Touring equipment.
Social accessories.

The first general problem to be answered in selecting a stock to be sold is whether or not this merchant could sell articles that are merely handed over the counter or confine himself to those for which service or maintenance is an advantage.

If the dealer confines himself to those articles for which service is an advantage, he immediately eliminates many of the articles that will be mentioned in this article. Some dealers in deciding against such articles have taken the position that they do not want to enter price wars with department stores and mercantile establishments that base their sales appeal on price alone.

Such reasoning is in the main faulty, as service is always an asset and in every city today there is a store that holds its customers by an appeal for quality and for service to its customers. This service is not in using a wrench or a screw driver, but in telling the customer the truth about merchandise and seeing that the article sold to the customer is suitable for the use he wants to make of it. But to get to details. A word about the main article of merchandise.

Automotive Vehicles

This subject is a very broad one and no effort will be made at this time to consider the various kinds of vehicles and their relation to the dealer. We believe that the tendency of the dealer field is gradually toward the dealer selling what often is referred to as a "line of vehicles." The manufacturers tried this idea out years ago but production requirements killed it. The pioneer manufacturers thought the big idea was to make a car to fit the purse of every prospect and then a truck or two besides. But this did not work for mechanical reasons.

There is no question however but that it will work for the dealer. Even in the large cities, many highly successful dealers are selling two or three cars priced sufficiently far apart to keep them out of direct competition. It is only in the larger centers of population that there is a sufficient demand for a single make car to justify a dealer in erecting a proper kind of an establishment to sell and service one make of car. There is no question but that this plan, if there is a sufficient demand, is ideal. If the dealer sells only one make of car, he should confine his entire line of maintenance, accessories and equipment to this one car.

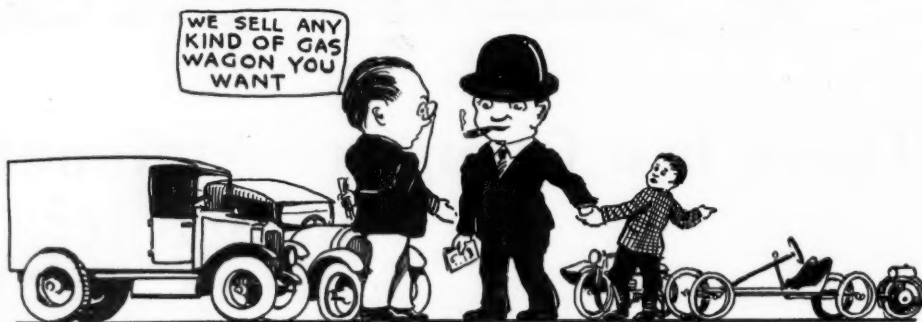
But many observers believe that the day is coming when the small city and country dealers will sell bicycles, motor cycles, low, medium and high priced cars, trucks of various capacity and tractors, besides the other equipment mentioned in the first tabulation of this article.

This man would then be in a position to meet the requirements of all of his prospects and his maintenance department could be properly equipped to meet the demands made upon it. It is very seldom that maintenance when sold for only one make of car can support a shop in the style that permits the equipment that is really needed to keep the cars on the road. Proper equipment for a maintenance shop today runs into money and most of the major machines, such as lathes, drills, arbor press, grinders and the like can be used quite impartially on different internal combustion engines.

A development in manufacturing is to group factories that make non-competitive vehicles. This is not general enough to be called a tendency in manufacturing, but it does exist and only recently new combinations have been formed.

It is only reasonable to expect that sooner or later these related vehicles will be sold in combination only with vehicles made by the same company. It is only to be expected that, at some time not yet on the date book, the products of a single company will be lined up in dealer representation. Say the Runwell motor car is made in three models, selling at \$800, \$1,200 and \$2,000. The Biltwell has practically the same combination. You would not expect the Runwell to permit a dealer who sold that \$800 car and the Biltwell \$1,200 car to continue indefinitely working against this company's higher priced cars.

If the Runwell company also made a truck, it appears to be only reasonable that eventually this company will insist that



the car dealer in Haney's Corner who sells the \$800 car let it be known that he represents the entire Runwell line and is a booster for this line of vehicles.

There is another change coming in the vehicle dealer field. This is that the higher priced cars, which do not hope to have a dealer in all small communities, are naming worthy maintenance dealers in these communities as their representatives. These dealers carry a small stock of emergency parts, are permitted to put a Runwell service sign above their door and a special arrangement is made whereby the maintenance man gets a commission on the sales of this particular car that he brings to the attention of the nearest dealer who carries these cars in stock.

The question as to whether a dealer sells a tractor, is largely a question of his personal interest and his community. Tractors are not for the large city dealer. That has been demonstrated. Another question is whether or not the dealer who



has a farmer trade on cars and trucks can afford not to sell a tractor. If he does, the tractor dealer is likely to steal this customer because of his maintenance methods, his general attitude toward farm customers and many other methods of winning farmer trade. If a dealer is in a community where tractors are in demand, he is likely to need the tractor to complete his line and to hold his former customers. If he puts the tractor deal over, there is no doubt as to his profits.

Maintenance

There are two kinds of maintenance dealers; those who sell maintenance to support their position as a vehicle dealer, and those who sell maintenance as a major line.

The new deal is selling maintenance; regardless of which class the dealer comes in, it is taking hold. This new deal is based on the flat rate and a special salesman to meet the customer. This salesman meets the customer on his arrival, diagnoses the job, puts a price on it according to his best judgment, follows it through the shop, tests it and finally delivers it to the customer and sees that the customer is satisfied.

This salesman is rapidly getting to be the most important man in a maintenance institution and frequently is the most highly paid man. In the smaller shops he is the superintendent and in the larger shops the superintendent is in charge of the salesmen as well as the craftsmen. Usually he finds it more difficult to keep a line on the salesmen than the craftsmen.

Naturally the maintenance shop organized to support a sales department devotes its entire attention to one make of car, if this company has sold enough cars to justify such specialization. In this case the flat rate and time study problems are rather easy. If the maintenance shop is arranged for all makes of cars and its sales appeal is so based, there must be much more information as to the cost of jobs and the salesmen, as well as the personnel within the shop, must have a wider experience.

Regardless of which sales appeal is made, the sales department is of prime importance. In a very small shop, it may be the proprietor. In this case, this proprietor should have at hand collected data, properly indexed, so that he can instantly refer to his cars and tell the customer how much the job will cost and when it will be ready. Two factors enter into the second part of the answer: First, how much work



is ahead; second, how long this particular job will take.

It is quite important that this job be finished on time and, it is important to the proprietor that the advance estimate on the job should cover the cost and a sufficient profit.

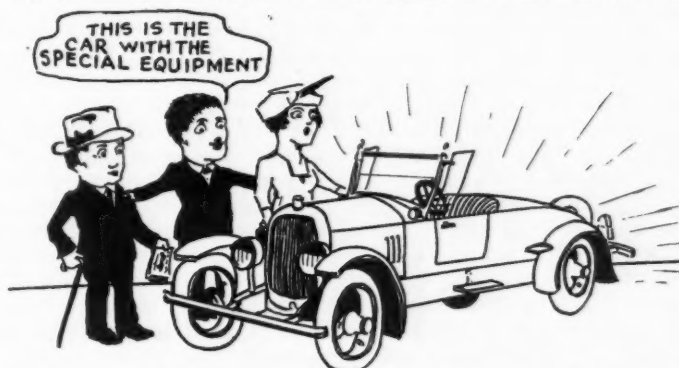
There has been much written and much said in the past about the necessity of good mechanics, those who understand the work before them and who have a sufficient pride in their craftsmanship to turn out good work. We will admit the prime necessity of this contention here and pass it as a fundamental.

Too little has been said in the past and is being said at present about the necessity of properly selling the work and making an honest price that will return a profit. Good craftsmanship will avail nothing if this craftsmanship is not properly sold and if a sufficient profit is not charged to support the craftsman and the organization for which he works. It is an injustice to a good mechanic not to properly merchandise his work and make a sufficient charge for it that he will be relieved of the anxiety of where he will work next week to be able to support his home and family.

Expert craftsmanship depends much upon the feeling of security the mechanic has in the continuance of his weekly paycheck. This security to a very large extent depends upon the proper selling of the establishment.

Special Equipment

By this is meant equipment for the car and other vehicles sold at retail in the establishment. For instance, the Runwell car and trucks are the chief articles of merchandise. It is admitted that few cars and trucks manufactured carry with them, from the factory, all of the equipment that most owners



would like to have on their cars. This is especially true of the cars in the highly competitive price class.

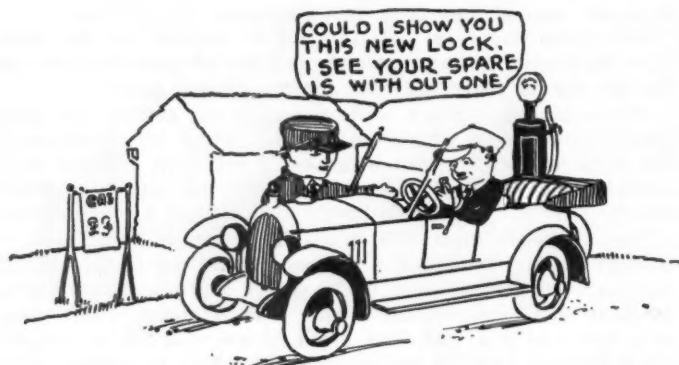
There are bumpers, spot lights and many similar articles that owners like to have and some makes of these articles look much better on one car than another. Some look like they belonged to the car and others look like they were hung on. The idea here is that the dealer should stock those articles that look like they belonged. Not only should he stock them, but he should sell them.

There is in Chicago a dealer in a fairly high priced car who stocks everything that he believes should be permitted on this car. He keeps on his sales floor a sport type of car all dolled up in all of the ornaments that he can get on it. It advances the price something like \$200 and he sells a good many of these cars.

Very often persons who are looking at the phaetons (these are always shown as they come from the factory) will ask about these ornaments and will buy some of them. If they do not ask, the salesman calls their attention to the bumpers, and some other necessary articles.

Another Chicago dealer selling a car in the \$1,000 class always keeps a phaeton on the floor with a winter or California type top. When he sells one of these, it means \$230 additional to the price of the car and about one in five of the phaetons he sells are so equipped.

Just how a dealer should show this class of goods is a much discussed subject. Some very successful dealers never show equipment or accessories in street windows. Their display cases are near the maintenance department. Some have an entirely separate sales room for such articles. Usually such a stock does not add to the overhead more than the



wages of a clerk. As this clerk really makes sales, this is not much of an addition. The expense of carrying the stock is not much, because jobbers like to sell well enough to sell in small quantities.

General Equipment

If the dealer is not selling a car, the problem is different. He must carry a larger stock to meet all demands. But in putting in such a stock a dealer should always be informed as to what cars are running in his community. If the Runwell car has never been sold there and none are registered, why stock spark plugs and other equipment for the Runwell?

Accessories and equipment are easily advertised. Letters to owners always should let the owner know that you know what kind of a car he drives and that you have equipment in stock for his car.

The general maintenance dealer always should carry a stock of general lines of equipment and accessories. He should have an oil and gas station as this forms an excellent point of contact for his salesman to reach the owners. He can ask them, as they drive up, if they do not need this article or that. Since the "Ask 'em to Buy" movement was started, oil pump men have sold as much as \$300 worth of equipment in a day.

The silliest practice in vogue in automotive dealer establishments today, and this includes both vehicle and maintenance dealers, is to not carry these articles regularly or to let on like you do not, and then tell a customer that you can get them for him at wholesale. This is even worse than silly. If you are not a dealer yourself, why spoil some one else's business. Every merchant is entitled to a profit on every thing he sells and if he sells without a profit, he does not deserve sympathy when he goes broke. There is a dealer in high priced cars and trucks in Chicago who clears more than \$2,000 a month on his equipment business. There are many car dealers who carry only a \$300 stock who turn it weekly and some do double that amount.

Many small dealers who have a good maintenance business turn such stocks weekly. The jobbing business in accessories and equipment is highly competitive and salesmen from these firms call often on live dealers. Orders are promptly filled and quickly delivered. There is not a business in this country today handling non-perishable stocks that turns its stock more quickly and at a better profit than the automotive accessory business.

A good many dealers have rather turned up their noses at the trade in trunks, robes and other such materials. The excuse most often offered is that the discount in these lines is not the same as in other lines. That really is a funny reason to decline to trade. Suppose a druggist declined to sell anything that did not pay as great a profit as epsom salts when sold in small packages. There would be mighty little left in his store.

Perhaps the trade risk in these articles is less than on other goods. Perhaps there are other reasons for different discounts. Should these reasons, whatever they are, bar the dealer for turning an honest penny and keeping his car owner from getting the department store habit? Better watch this department store thing. Some day your car owner will be going there for a lot of the things that pay you your regular discount. Then, too, the day is likely to come pretty soon when the department stores will be selling cars and then the price war will come in earnest. The department store folk are likely to get the idea that it would be good business to sell

a car without profit and depend upon equipment and maintenance for profits. When they do, with their advertising ability, they will make things interesting.

Tires

Tires are brought into this article separate from equipment because they represent one of the neglected opportunities of the automotive dealer. One mail order house sold to car owners \$12,000,000 worth of tires during 1920. These tires were, of course, sold without service of any kind and this trade was obtained by the mail order merchant chiefly because the automotive tire dealers of the country had not made the most of their opportunity to talk quality and service to the car owners of the country when the cars were purchased.

In past years the merchandising policies of the tire manufacturers were in many cases extravagant and unwholesome. The standard of discounts to dealers was not maintained and competition was met in an unfair way.

Recently there has come into the manufacturing of tires some men who are quite anxious to make the tire business acceptable to the automotive dealer. They are not the set who supply a dealer who will properly service tires and then load up a price cutting store in the next block with a stock of the same brand of tires. These men, and the factories they



represent, are endeavoring to establish a new code of ethics which is certainly greatly needed and they should be given every support.

The tire business is out of place in the department store and the mail order house and the proper educational effort on the part of the manufacturer and the automotive and special tire dealers would quickly bring it where it belongs, to the great benefit of the car owner.

The tire repair business belongs to the new tire dealer. This line of business has suffered much in self respect because it has not been properly merchandised and as a result many tire maintenance shops are merely dumps and people dislike to take tires into them. As a result, many repairable tires have been thrown away and this service to the car owner and business for the maintenance man is lost.

Touring Equipment

This business has been almost entirely discarded by the automotive dealer. Apparently the automotive dealer considered it of too little importance for his attention. But the volume is gaining and those dealers who have made window displays of touring scenes have been amazed at the inquiries



that have resulted. In some cases these automotive dealers have established connections with sporting goods houses and jobbers in these goods and have made a considerable volume of sales to their own profit and to the satisfaction of their customers.

Some of the most successful automotive dealers in this line have made their sales practically without stock investment. They arrange the display and then obtain articles for delivery from the jobber as needed. It is seldom that the touring equipment customer demands immediate delivery of the entire outfit.

Social Accessories

In the smaller cities the social accessories are not often carried in stock and where you find a dealer who does carry them, you will usually find that he has stocked them at the suggestion of his wife. It is not necessary to buy vases, cigar

lighters, robes and similar articles in great quantity, but if the automotive dealer does not stock and sell them he is passing an opportunity for neat window display, prestige, sales and profit to the department store, jeweler and harness maker. There is a large volume of these sales and the automotive dealer is not getting his share of the cash.

The robe business, like that of trunks, has been allowed to stay in other hands because the automotive dealer saw fit to quarrel with the discounts already established in specialized lines of trade.

The object in outlining the scope that a stock of automotive merchandise might take is not to present a must list or to intimate that a dealer should handle all of these articles. There is an axiom in merchandising that the first sale is the most difficult sale and if this sale is properly made, there will be less resistance in the second sale. It seems rather absurd that a vehicle dealer should neglect his opportunity.

Improved But Cheaper Enclosed Bodies Are Predicted

By J. EDWARD SCHIPPER

NEVER in the history of the automobile business has body design occupied so important a position as it does now. No one who is in close touch with the industry fails to realize that there is a tremendous amount of closed car business to be had this fall. It may be taken as a maxim that the manufacturers who hit the nail most squarely on the head in respect to body design will be leaders in the fall selling. The low-priced closed bodies which have been on the market for a year now have done more to educate the public to the closed car than years of sales arguments and expert coach work.

To put this in another way, the public has never failed to realize the value of the closed car, but it has failed to comprehend the vast difference in price between the closed and the open car. The market has been hungry for a long time for the utility closed car, but it cannot be gainsaid that the market is to a considerable extent disappointed in the earlier types which have been put out. It may be that the pendulum swung too far the other way, and that in order to get down to a price which approximates that of the open car, a certain amount of durability, appearance and other qualities desirable in a closed vehicle were sacrificed. Indications that many manufacturers believe this to be the case have already begun to make themselves apparent. We are finding more substantial construction, involving chiefly the use of pressed steel parts where wood was formerly employed. It is quite apparent that the successful utility body of the very near future is to be a compromise between the earlier form where everything was sacrificed for price, and the regular coach maker's closed job wherein quality was the prime requisite.

Pressed Steel Instead of Wood

It will very likely happen that after we have learned how to build the closed body as it should be manufactured, the result will be a product which is superior to many of the so-called coach maker's jobs. It is certain that the extensive use of pressed steel is replacing wood in many of the parts where formerly it was believed impossible to use anything else, but steel has not only added to the simplicity and strength of the structure, but has also eliminated a great amount of hand fitting work and made it a machine cut proposition.

The all-steel closed body has a great many problems wrapped up with it. Primarily, it is impossible to manufacture an all-steel closed body without making a large quantity job of it. It is quite apparent that the tremendous die costs for the pressed steel parts for such a body can only be absorbed through tremendous production if the real benefits of pressed steel are to be derived. On the other hand, if it is possible to eliminate wood altogether as one very large manufacturer has recently done, it is possible to save money in

other directions outside of manufacturing. One of the biggest sources of saving is in the finishing of such a job. Instead of using 15 or more coats of paint, it will be possible to get down to 2 or 3 coats of hard baking enamel which can be governed more uniformly, and also provides a surface which stands up under weather conditions and under even more severe washing conditions.

A new angle of the used car problem is presented in the merchandising of closed bodies this fall. The new economical type of closed body on a new chassis must be put out at an attractive price to compete to some extent with the used closed bodies which are on the market. To put this in another way, the new type of closed body will be most successful if it gives all of the comforts, appearance and durability of the former coach maker's type of closed body, together with the manufacturing economies made possible (1) by the greater use of pressed steel, (2) by the elimination of expensive curves and bends, and (3) by so designing that to some extent sub-assemblies may be employed which will eliminate the necessity for interior hand fittings, which require the highest class of labor and, owing to the awkward position of the operator in performing the work, are necessarily expensive and laborious.

Public Learning Value of Closed Cars

It cannot be denied that the low-priced closed cars of last fall have been of tremendous value to the industry. They have taught the public to buy closed cars. They have taught the industry that it is possible to manufacture an enclosed car cheaply, even if it has to be done at the expense of what was formerly considered good practice in the coach builder's art. The final outcome will undoubtedly be a body which will cost the public a little more money than the old line closed bodies. This is the type of body which is going to sell this fall, and the manufacturer who rings the bell with a closed job will find it difficult to keep demonstrators on his dealers' floors.

A. A. A. SANCTIONS KANSAS CITY RACES

KANSAS CITY, Mo., Aug. 14—A sanction has been granted by the American Automobile Association for the opening meet of the new Kansas City board speedway, which is scheduled for Sept. 16. It will be a championship meet for which \$30,000 in cash is hung up, while it is expected that \$20,000 additional will be raised among the business houses to be distributed as lap prizes. The new speedway is 1¼ mi. and the cost of the plant is estimated at around \$500,000, including a steel framed grandstand. The track was built by Jack Prince.

New Mitchell Line in Two Wheelbase Lengths

Five Passenger Models on 120 in. Wheelbase; Seven Passenger on 127 in.; Mitchell F-50 Engine Developing High Torque at Low Speeds Is Used

MITCHELL is now in production on its new line of cars, the chassis of which are made with two sizes of wheelbase, 120 in. and 127 in. On the smaller chassis is mounted the five-passenger phaeton, three-passenger roadster, five-passenger sedan, four-passenger coupe and four-passenger sport. The larger chassis takes in a seven-passenger phaeton and seven-passenger sedan. All of these cars are finished in blue or maroon, with gold striping on the maroon and cream on the blue. The cars are equipped with the F-50 engine designed by P. J. Batenburg, chief engineer, and built entirely in the Mitchell factory. This engine was described some time ago in these columns. One of the chief characteristics of this engine is a high torque at relatively low speed.

Long Body Lines

Among the visible features of the open models is deck line and hood which are made with a slight curvature so that the reflected light on the hood gives the appearance of a straight line extending the length of the car. The shoulders of the radiator, the cowl and fender crown have been worked out to harmonize with the body curves. Drum type headlamps add to the appearance. On the sport model these lamps are fitted with lenses of French fluted glass.

The windshield is of the two-piece ventilating type. Two handles are fitted to the lower section to equalize the pull and prevent breaking the glass when opening it. One of the features of the side curtains is that they fasten both inside and outside, thus giving ample protection in inclement weather. They open and close with the doors.

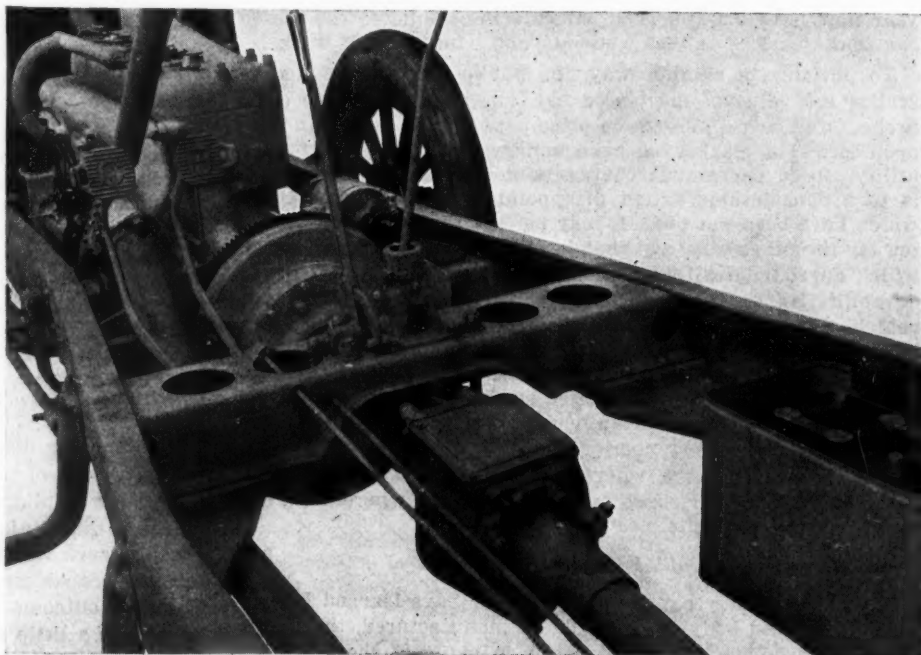
The weight of the various models including water, gasoline, oil, spare rim, tools, etc., is as follows:

5 passenger phaeton	3,396 lbs.
3 passenger roadster	3,287 lbs.
4 passenger coupe	3,685 lbs.
5 passenger sedan	3,823 lbs.
7 passenger phaeton	3,555 lbs.
7 passenger sedan	4,117 lbs.
Deluxe sport model.....	3,417 lbs.

The equipment on the Deluxe sport model is very complete and includes wind deflectors, bumpers front and rear, roll type visor, windshield wiper, mirrorscope, extra tire and cover, bar type radiator cap, Boyce motometer, clock, French



The DeLuxe Sport Model Mitchell has a 127 in. wheelbase and is completely equipped. The car is hung low and fitted with a body having curves of small radii. The rear hub cap is of large diameter and hugs the wheel closely

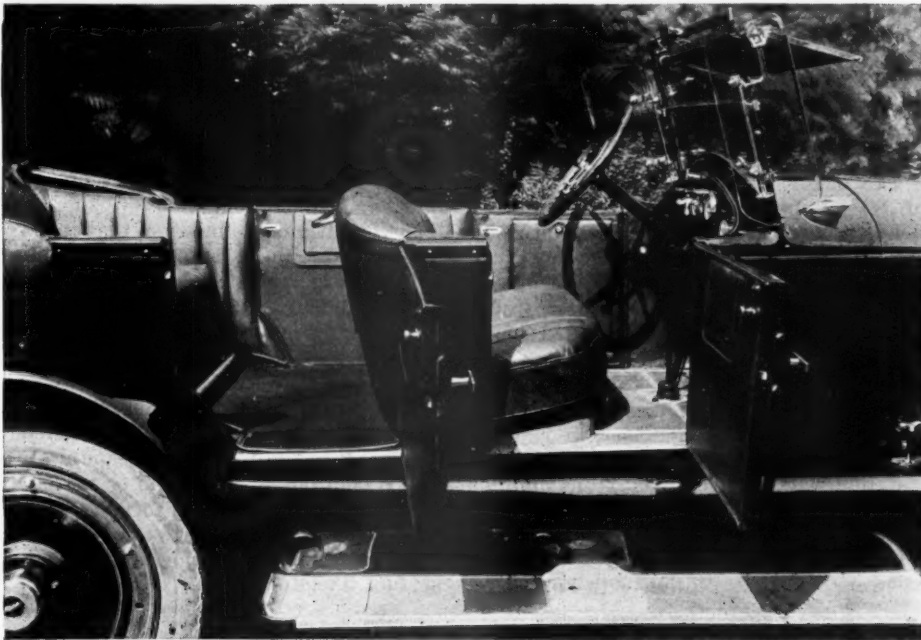


Accessibility has been one of the keynotes in designing the new Mitchell. The gear-set, for example, can readily be removed by taking out a few bolts. Clutch adjustment is on the outside, also true of the adjustment for the gearset countershaft bearings

fluted lenses, nickled lamps and tools. All models are fitted with a motor driven horn and a tire pump driven from the engine.

The frame is pressed channel steel 6 in. deep and of 3/16 stock. There are four main cross members and six including the rear engine arms and radiator support bar. The frame is bottle neck type, hot riveted, 2 in. wide and made

by Mitchell. It is mounted on semi-elliptic springs in the front and cantilevers in the rear. These are respectively 40 in. by 2 in. and 50 by 2½ in. There are eight leaves in the front spring, nine in the rear and as high as eleven in the large sedan. All springs have a rebound plate. The Deluxe sport has fourteen thin leaves in the rear springs. The shackle bolts are 9/16 in.



Interior of the DeLuxe Mitchell. Tools are carried in the front left door and the curtains in the rear of the front seat. A feature of this car is that the curtains fasten both inside and outside

Wood wheels are regular equipment, with disk on the Deluxe models. Cord tires are fitted consisting of 32 by 4 in. tires, on the 120 in. chassis, excepting the sedan which, with the large phaeton and sedan, has 32 by 4½ in. tires.

The front axle is of conventional design and built in the Mitchell factory. It is equipped with ball bearing thrust bearings on the spindles. The knuckles are chrome vanadium steel. The front wheels have a caster of 3½ deg. The steering gear is also of Mitchell make, worm and gear type and fitted with an eccentric bushing on the cross shaft to

take up wear. All adjustments are on the outside of the frame. The steering wheel is walnut finish and 18 in. in diameter.

A full-floating rear axle, made by Mitchell, is used. Spiral bevel gears with a reduction of 4.42 to 1 are fitted, the pinion and shaft being forged and machined in a unit. There is a bearing behind the pinion and two ball-bearings ahead of it. The drive is taken through the springs and the axle torque and braking reaction through a tube. The axle shafts including the flanges on the wheels are made from a single billet

of steel, which in its original state measures 3½ in. in diameter and 11 in. long. This makes for strength in the shaft. The brake drums are 14 by 2 in., with foot brake external and hand brake internal operating through cams. The hand lever is placed to the left of the gear-shift lever.

A Mitchell Borg & Beck clutch is fitted with an outside adjustment. A single universal joint is placed between the clutch and gearset, the latter being mounted amidships where it is very accessible. The universal is of the block and trunnion type. All gears have a ¾ in. face, the teeth being 6-8 pitch. The mainshaft is mounted on ball bearings and the countershaft on roller type bearings. The adjustment for the countershaft gears is on the outside of the case. The diameter of the driveshaft is 1½ in.

A Harrison radiator is used and this is spring mounted on a cross bar ¾ in. thick by 2 in. wide. The water capacity of the cooling system is 6 gal. and this is circulated once every minute when the engine runs at 1,800 r. p. m.

The body frame work is of ash and maple, with steel panels. Body weaving and any tendency for looseness is materially prevented by using ten hold-down bolts on the smaller cars and from 12 to 14 on the larger models. A felt and flintcoat lining is used on all metal surfaces which touch. Upholstery is carried out in machine buffed leather, French plaited. The top is lined with gray whipcord. The bodies have been made very rigid by the use of long and substantial brackets, which are drop forged steel in place of castings. Fenders are 18 gage pressed steel, with stamped steel irons.

New Stanley Has Numerous Improvements

A SERIES of improvements, although none so radical as to require changes in design, has caused the Stanley Motor Carriage Co. to give the Stanley steamer a new designation and it is called the model 740.

This improved model is offered at an advance of only \$150 over the model 735; the prices are as follows:

7 passenger phaeton	\$2,750
5 passenger phaeton	2,750
2 passenger roadster	2,750
7 passenger sedan	3,985
4 passenger brougham	3,950
Chassis only	2,425

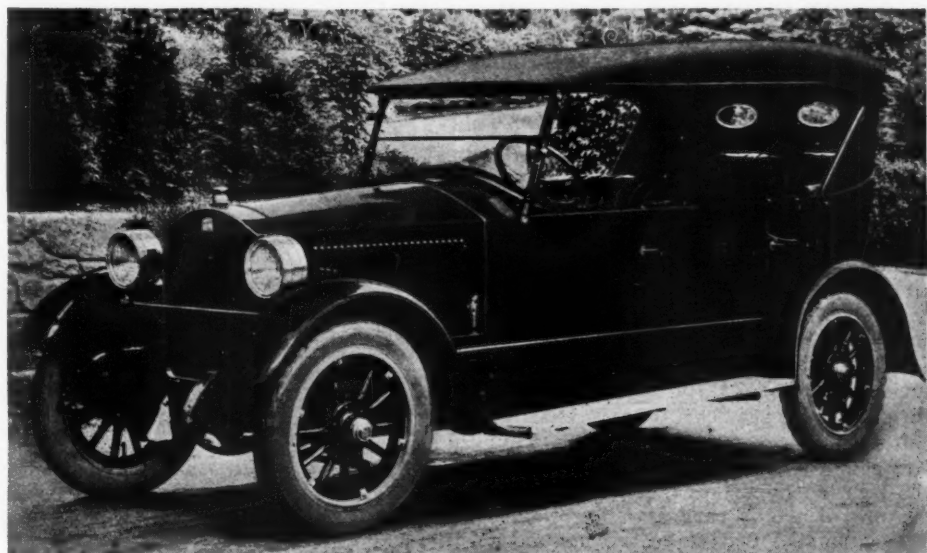
A brief outline of the principal improvements in the model 740 is as follows:

The car is mounted closer to the ground.

The boiler is 18 inches high instead of 14.

There is a larger condenser.

Much larger brakes are incorporated.



1922 Stanley, Model 740, 7-Passenger Phaeton. Price \$2750, F.O. B. Newton

The lubrication is greatly improved.

There is a larger fuel pressure tank.

The car sits nearer to the ground with 32x4½ inch wheels; lower running boards; more sturdy mud guards, with more graceful lines; lower-set top, lined, with permanent firm member from windshield to rear bow; instrument board with more compact location of instruments; barrel lamps, more rigidly mounted.

The rear axle has been substantially improved. It is more sturdy; it is simpler in design; it is simpler for service; the bearings are enlarged, better mounted and better lubricated; the rear axle pump drive case is now provided with an oil well, affording splash lubrication for the pump drive crank; the dynamo mounting is simpler and more rigid; the axle drive shaft is larger in diameter, and the wheels are secured with keys instead of with squared and tapered sections, thus permitting simpler, sturdier

and more accurate adjustment.

Both brakes are much larger, the foot brakes being 2½x49½, an increase of 46 square inches or 60 per cent; the design is simplified and improved; adjustment is rendered more simple, accessible and positive.

The boiler is 18 inches high (instead of 14) giving about 30 per cent greater heating surface and therefore improved generating capacity. The water level indicator, water level regulator, and other fittings are set at the same distance from the top as in the 14 inch boiler, thus giving 12 inches of water instead of eight, or 50 per cent greater capacity for power storage at normal water level.

The condenser is increased in capacity about 8 per cent.

Cylinder lubrication has been simplified and rendered more positive by adopting an improved lubricator which permits pumping a small amount of oil with assurance so that dilution with kerosene

is eliminated. Provision is made for giving the engine additional oil by hand before starting, or when conditions warrant. One filling of the oil box is good for upwards of 2,000 miles.

Chassis oiling has been made simpler and easier by the use of a patented system of oil cups with an oil gun for quick and efficient filling.

The throttle is mounted so that it may be removed without disturbing the boiler cover. It is operated by an improved lever, and has a more graduated opening, reducing the opportunity for abusive starts.

The main burner pressure system contains a single pressure tank instead of the former system (1.6 gallons instead of .8) which will permit steaming up from a cold boiler with little or no hand pumping. It is located as formerly.

A basket filter, similar to that provided on the water line, is now provided on the fuel line.

New Model Columbias Carry Powerful Motor

PRACTICAL refinements, including a new and more powerful motor, are noted in the new Elite models of the Columbia, just announced. The new series comprises five body types: Five-passenger phaeton, 4-passenger sport model, 2-passenger roadster, 4-passenger coupe and 5-passenger sedan.

All five models are powered with the new model 8-R Continental engine, with a larger bore, better acceleration and greater horsepower. It develops in excess of 58 brake h. p.

The use of improved springs in the seat backs and cushions makes possible a greater degree of riding comfort. The paint work also is of superior quality. The touring and sport models are finished in Suburban blue with ivory stripe, the roadster in Murphy red and the enclosed types in Columbia blue.

The phaeton and closed types have a cowl ventilator and wood or wire wheels are optional. Wire wheels are standard on the roadster and sport models.

Every motor vehicle in Poland confronts the problem of securing suitable gasoline and oil. The crude petroleum found in Poland is of very low gasoline content, about 6 per cent, compared with 12 and 15 per cent in the United States. In addition, the gasoline produced locally is of very poor quality, sometimes having a specific gravity as low as 590. The oil also is usually of poor quality and heavy grade unsuitable for use in smaller engines.

Notwithstanding its poor quality as fuel, gasoline sells for 550 marks per gallon (about 35 cents) and is difficult to obtain even at that price. This fact coupled with poor service facilities, has been an important factor in keeping the use of motor cars at a low point: it is estimated that there are not more than 6,000 gasoline motor vehicles in Poland today.



New Elite Sedan Model of Columbia Six has 8-R "Red-Seal" Continental Motor, Timken axles, cantilever springs, cowl ventilator, choice of wood or wire wheels



New Elite Sport Model of Columbia Six has same units as model above, with bullet lamps and wire wheels

The Place of the Small Tractor in Merchandising

The Stage Appears to be Set for a Repetition of the Automobile Development—Ford Experiments Appear to Have Solved Many Problems

RECENTLY the Ford Motor Co. issued a statement that the present unprecedented sales of Ford cars were regarded by the company as due less to the buying impulse of the public than to the persistent sales effort of the more than 8000 dealers and many thousand salesmen. During the buying slump, the Ford Motor Co. saw to it that their dealers did not stop sales effort. Sales forces were maintained and every salesman kept on asking everybody he met to buy a Ford and telling him why and how he could buy one and "spend the difference."

A few years ago there was a great jealousy and fear of Ford in the automotive industry. There was a feeling that he was out to make and sell all of the motor cars. Today you do not find this feeling. Motor car manufacturers have seen that Ford is opening up a great market by inducing people to buy cars at a low price and learn the value of automotive transportation. Every other dealer and manufacturer now believes that a Ford buyer will soon be a prospect for a higher priced car.

Competition Welcomed

About two years ago it was announced that the Ford Motor Co. would build a larger truck than that company had yet manufactured. At that time other truck manufacturers were asked what they thought about this project. Some of the men feared Ford competition but a considerable number welcomed it. They believed that the Ford made truck would pioneer among a lot of persons who have been slow to accept the idea of truck freight transportation and thus enlarge their own possible market. They were willing to take their chances on this possibility.

They probably will have the opportunity to actually test this idea soon. It is a current report that the Ford 2½ ton truck will be in the hands of dealers in the near future and that orders are now being taken for this truck.

Today the Ford Motor Co. is going through in the tractor field what it did in the automobile field several years ago and what it will have to go through in the truck field, once this larger truck begins to flow through the factory.

When it was announced that Henry Ford was giving practically all of his time to experiments with a tractor to be made on a production basis, tractor manufacturers shook their heads. Ford continued to experiment on his farm near Detroit and there was not the slightest effort at secrecy on his part. He is too good an advertiser to be secret about either successes or failures.

The Tractor in the Car Salesroom

The more that was printed about this tractor, the more doubts were expressed by those familiar with the trade. But the tractor came through and was put out for sale by specially organized sales forces. The experiment in building up a quantity demand appeared to have failed when, presto, the Ford Motor Co. put the tractor on sale in the automobile salesrooms.

This was a daring venture, just as it had been a daring venture to put the light truck on sale in the salesroom of the Ford car dealer. Any old timer would have told you that the car dealer could not sell the light truck and car at the same. But he did.

More old timers could have told you (and doubtless did tell you) that the Ford car and truck dealers could not possibly sell the tractors. But they have.

The Ford Motor Co. is the biggest laboratory in the automotive field and its chief function appears to be to find the problems on which the rest of the industry is hopelessly divided and to tell its sales force to settle them by a demonstration. Just at this time (as for many years past) the tractor industry is debating as to whether an automotive dealer or implement dealer can best sell tractors. Ford has settled this and has proven the answer. It is written in the production figures of the Ford Motor Co.

Why debate the question any longer? The only basis for a further discussion is that "my product is different." More merchants have fooled themselves into bankruptcy by that belief than almost any other supposition.

Just as a further point along the same line, consider the experiment with the sale of the Lincoln cars. The big fact stands out that when the sale of this car was placed in the hands of the Ford organization, the factory quickly went to capacity production.

For several years the tractor manufacturers of this country have been studying this question of who could sell their tractors. Some of them are still studying the question, despite the fact that the Ford Motor Co. has supplied the answer.

It is in the air that the Ford Motor Co. is soon to settle another moot question. This time it is to be the question as to whether the man who sells the tractor must sell the equipment. Most Ford tractor dealers who are highly successful today sell equipment, but this policy will be changed.

If reports are correct, the Ford dealers will be informed that they shall stop selling tractor equipment and let this trade go to those who have time to devote to it. Then the Ford Motor Co. and its dealers will be directly interested in tractor implement sales only to the extent of recommending the proper equipment.

Tractor Sales

There are many motor car dealers in this country who believe that a tractor department would be a profitable and proper department of their business. These men are not a bit frightened at the Ford proposition. They have been competing with the Ford car and the Ford light truck for years and know exactly what to expect from Fordson competition.

About all that remains for these dealers to do is to investigate their territory and decide what kind of a tractor is best suited to supplement the work of the Fordson, just as they selected their motor car and truck to sell in competition with the Ford. When they have decided what sort of a tractor they want, they merely need to go over the list of tractors and pick out the proper one. Then get a contract and go to selling it.

From what MOTOR AGE has heard of the tractor industry lately, it is believed that it will not be difficult to talk business with any factory. Manufacturers want and need sales and they admit it.

The Fable of a Dealer on the Down Grade Who Was Shown up by a Biscuit Shooter

By TOM WILDER

With Apologies to George Ade

ONCE there was a Feminine Food Hurler who Balanced a Wicked Tray in a La-di-da apartment hotel. No one had ever asked for her photo to put over an advertising Campaign for a beauty product, hair tonic or figure improver, but she was There with a pleasant nod, a sweet smile and a high score for neatness and smart appearance with no attempt at a place in the Spot Light.

She could carry more orders on one tray without Slopping or Messing them up than a Gaston or Herman of the Old School and never made the Fatal Mistake of bringing the wrong thing or mixing orders.

While the other girls were standing around waiting for the Rush Hour, Bettie's tables were all full and it was a practical fact that all the others ever got was the overflow.

The Manageress spent much time smoothing down the Ruffled Tempers of the other Dish Toters but Passed the Buck back to them everytime they made a Holler, claiming they themselves were at fault. She did all she could for them, Steering all the customers she could, especially strangers, to their tables. She had to satisfy her patrons, however, and if they came in with the intention of eating at Bettie's table and she tried to dissuade them, they might Pass Up the Dump entirely next time.

So it went on; Bettie would be dealing out the Table d-Hote to 12 to 16 customers and they would be the only ones served. She was so popular that the people would come early to get in before her tables were all full. Her apron pocket was jingling with tips before the four other girls went for their first orders.

Now the Story of Bettie means nothing in the life of the average Automotive Dealer but it had a wonderful effect on Old Jim Saunders. Jim wasn't so old either but earned the prefix, because he had such a Grouchy Manner.

Jim started business in a mining town where they Treated 'em Rough. He Cleaned Up pretty well and when the Boom was over and the town showed signs of dying a natural death he sold out to advantage before the end came and Made Tracks back to God's Country.

Transplanted in a day from the land of the mule pack train, the only thing Jim could see was Automobiles and he resolved to plunge in forthwith.



Once there was a Feminine Food Hurler who Balanced a Wicked Tray

Being a storekeeper rather than a salesman by training he resolved to start on accessories and tires and take on Cars and Service as soon as he could pick up experience.

Though he hadn't found it out yet his Knock 'em Stiff Mountain Methods didn't Make a Hit with his eastern customers. Though he had learned to work months ahead on his stock because of transportation difficulties he had also been trained in the school that makes the storekeeper Boss with the customers Holding the Bag, where the storekeeper has what the customer Wants and Wants Bad and where the customer takes the best the storekeeper has to offer Without Argument.

With this early training and the assistance of Jobbers' Salesmen, Jim put in a complete stock which he considered was what his prospective customers ought to have. He fitted up a store that he thought was good enough for anyone to come to, and started to sell his stock.—No, he didn't do that either, he commenced waiting for customers to come and buy it. Some of them came and found his prices right, his place clean and his stock right; but some way there was no incentive to Come Again, no desire to patronize him, no friendly feeling for the place. There seemed instead an air of Come-and-get-your-stuff-and-get-out about the place, and with such a feeling no one wanted to go back unless Jim had something that couldn't be had elsewhere.

He had been wise enough to Hang out his Shingle on a well traveled tourist route so, as long as travel kept up, he did fairly well but with the closing up of the season trade began to slump, and by Thanksgiving he had nothing to be thankful for and not enough coming in to satisfy the rent man.

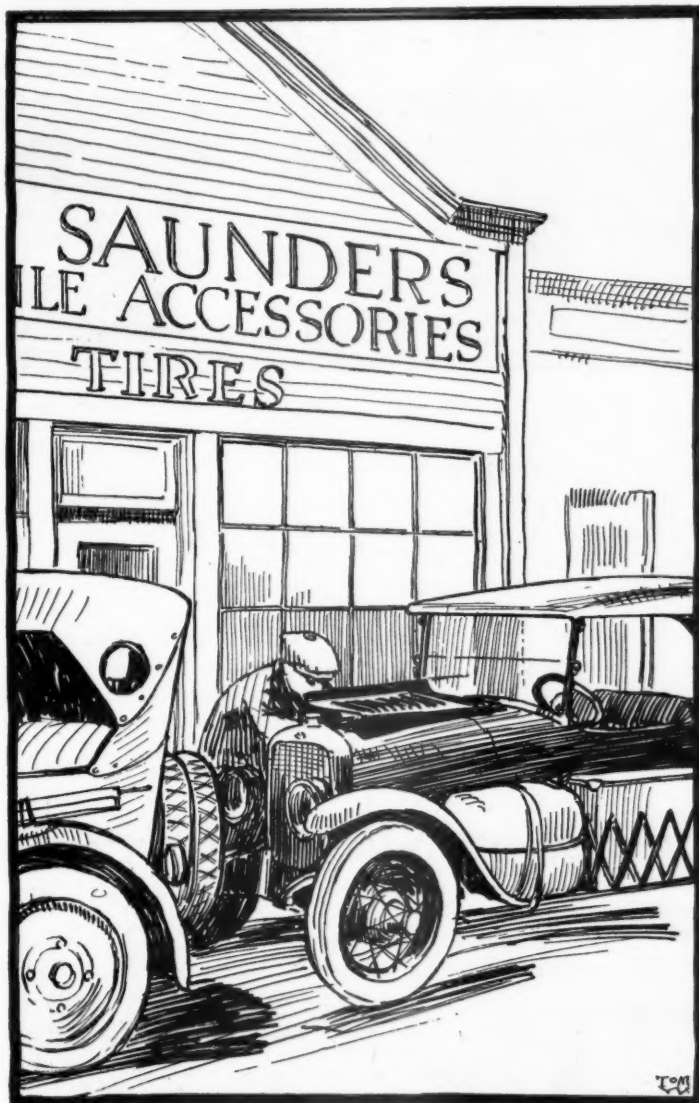
Having little to do, he came to Chicago to Look 'Em Over and Get Hep to some Ideas and while searching for ideas he was forced to Consume Food. As fate would have it he stumbled into the Gravy Dispensary where Bettie, the waitress, took almost Exclusive Toll of the Tips.

Seating himself, at the request of the Manager, at a table in a slightly deserted part of the room he very quickly noticed that one part was practically crowded. His first Hunch was that someone was Pulling Off a Party but upon closer attention it appeared that there was nothing in Common among the Diners except that they seemed to be attracted to that Particular Corner by some Common Cause.

When the Girl brought his soup he remarked that there seemed to be Large Doings over in the corner and wanted to know what was the Big Idea where-upon Her Ladyship Blew Up, Hit the Ceiling and Threw Seven Flits all in one.

After she had Raved On for about five minutes and had berated everyone from the Pres. of the U. S. A. down to the Management, Jim managed to get a chance to ask for a Spoon so he could start eating before his Soup got Cold.

To say that she had a Perpetual Peeve was putting it gently and he resolved to find out if possible where the Shoe



As long as travel kept up Jim did fairly well

Pinched so he asked "How does this Dame work it to get all the Trade, what's her Drag?" That was enough to start her off again full speed.

"Say! she gives me a pain! D'ya sponse fer a minute I'd soop around them nuts th' way she does? Not me! I got too much self respect!

"There's old lady Jones, she don't live here but would you believe it she wants us girls to take all the bones off'n her plate and wrap 'em up in a newspaper so's she can take 'em to her dawg. When she ast me I told her I wasn't no waitress to a Hound or Garbage Collector says I, they's a butcher shop around the corner where they sell Swell Bones! And would you B'lieve it, Bettie actually saves them bones and lots more b'sides.

"Then there's them two Old Maids, wants hot water in their tea and coffee and a hundred other Wrinkles other folks don't have and Bettie's Sap enough to remember all their fool notions. Say, I wouldn't serve them Nuts on a Bet but e-magine Bettie finds out when they come—always regular like the alarm in the morning—and actually has their dinner all spread out and covered up to keep warm."

deal to Jim. Where he came from, when a Guy went into a beanery, he went to have his Face Fed not to be Kiddled by a Tray-Tiller. He went in and sat down and in the course of time someone yelled Hamaneggs—Cornbeef - an - cabbage - Liver-an-bacon - Roastpork - or - Mutton-Stew in his ear, whereupon he gave said someone the High Sign and was shortly engaged in the Stocking process with everybody satisfied.

Here things were certainly different. The restaurant manager who could find waitresses to Hand Out the right amount of Refined Kidding could charge double or even triple the amount the other could and get away with it.

With his eyes opened to this Peculiar State of Affairs he, resolved to Brouse Around some of the Chicago Stores to see if they too were Kidding their customers.

Wherever he went he found that the most successful merchants were the most Successful Kidders, some of them carried it so far that it was a Fine Art. He noticed too that in the places where the Greatest Attempt was made to satisfy Customers, prices were invariably higher and that the merchant who resorted to price cutting to get business was the

"I suppose you take all the Normal customers and let Bettie keep the Nuts," said Jim.

"Say! that's what makes me Sore! If I get a Fella that aint too Tight fer a tip d'ya sponse I can keep him? The first time he finds an empty chair at her table he slides into it and it's Good Night. She slips him a lot of bunk about how nice he's lookin' or how sorry she is his foot hurts him or where was he yesterday she missed him."

"I suppose she tells him all her troubles," said Jim beginning to be annoyed.

"Her! I should say not! she ain't got no troubles except gettin' so tired feedin' all them Nuts, but it's her own fault. When her mother died a while back she didn't Let On she felt bad,—hardly told a soul. I'd a bawled my head off."

This was a new

one who employed Clerks, not Sales-People.

The further he went and saw the more he became Sold on the Idea and the crazier it made him to get home and try it on the home Town Folks. He had Listened In on the conversation of Sales-people of the Higher Grade until he was convinced that the secret of success was being Accommodating, Affable, Genial, and Agreeable. Whether Selling Goods from a Tray like Bettie or delicate embroidery in a Michigan Boulevard shop the Angle seemed always to be, Keep the Customer good natured.

When Jim got home the Reformation was carried out with Gusto. He shaved every morning, Bought some New Clothes and Blossomed out into a Regular Guy. Conversation didn't come so easy. To one who has always been Grouchy and Blunt, almost Morose, it is hard to Bust directly into Affability. He helped matters materially by hiring a young woman in Natural Possession of the Desired Qualities; the Price was High but he now knew the Expenditure would Pay. Besides he could take some lessons, as it were.

While the season was off, business gradually improved and he knew that by spring he would be All Set to Make a Killing the Coming Year.

Moral—A buyer may be a Grouch but a Sour Salesman Never Threatened the Prestige of a Marshall Field.



"Say! She gives me a pain"

Display of Disassembled Car Draws Big Crowds

A UNIQUE activity on Denver's "Automobile Row" recently was a parts show at the salesroom of the S. B. I. Motor Sales Co., Hupmobile distributor for Colorado and adjacent territory. The idea was originated by this firm for the purpose of educating motorists and prospective motorists regarding the what, why and how of the principal mechanical parts of the Hupmobile. All the important parts are displayed neatly on tables, and salesmen and members of the firm are on hand to explain the exact workings of these parts, the nature of material and construction, how to get the best results when operating a car, what to expect of a car, and to answer questions as thoroughly as possible, with the aid of the parts to make explanations clear and practical.

The parts show opened with an attendance of about 150, but later nights there were fully 400 visitors. From 6 o'clock till 10:30 five men were kept busy explaining, demonstrating and



The interest shown by the public in the above display was highly gratifying. The sign reads, "Something Different, Every Part Used in the Construction of a Hupmobile on Display Here." Five salesmen were kept busy explaining and demonstrating

answering questions, and the real interest of the visitors was highly gratifying.

The show was originally planned for the three days of the midsummer outdoor automobile show at the nearby Civic Center, but the attendance was so surprising and the interest so keen that the enterprise was continued the rest of

the week. In fact, many of the visitors asked that the show be continued long enough to give them a chance to send in their friends.

Two cars were sold as a direct result of the parts show, and the event is considered of far reaching value from both an educational standpoint and as a sales stimulant.

Old Man Gloom Buried at Dealers' Sales Meet

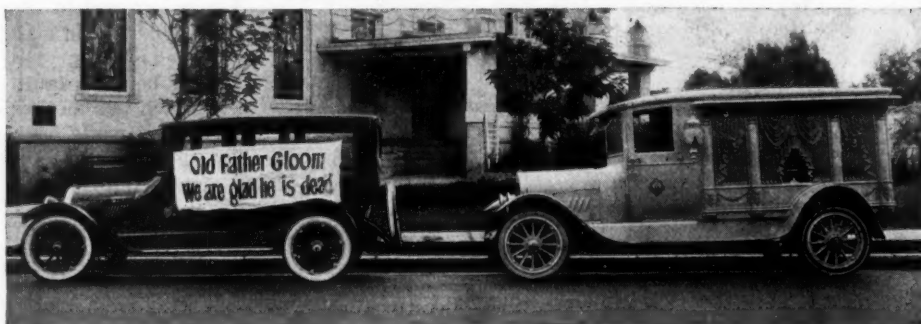
"BUSINESS is better now than it has been at any time within a year."

This declaration, based upon a careful study of conditions, came from W. W. Barnett, Denver, Oldsmobile distributor for Colorado and part of Wyoming and New Mexico, at the close of a two-day sales convention of his organization. The convention was attended by thirty dealers from all parts of the territory.

"There is no question but that stagnation was here, and that it had a frightful grip on a heap of normally good business folks for a rather long time," Mr. Barnett told the Rocky Mountain representative of MOTOR AGE. "But that fearful stagnation has gone," declared this pioneer builder of automobile business in the Rocky Mountain territory, "and the right kind of thinking and the right kind of working will keep us from feeling the grip of stagnation again."

"A few months ago, one of my dealers in a somewhat thinly settled territory claimed that business was absolutely dead. But a little encouragement renewed his grit. He set his teeth for further effort, gradually turned the tide of the struggle, and for the last six weeks has been coming to Denver with a smile like a mountain sunrise and driving home with an average of three cars a week."

One lively feature of the sales convention was a banquet out at Lakeside's world-famed Casino Balcony. On this occasion, which was attended by 86 members of the Barnett organization, Old Man Gloom was given an elaborate funeral service and laid to rest, gently but firmly and deeply, amid ceremonies



The burial of Old Man Gloom was performed with befitting ceremonies at the dealer gathering of W. W. Barnett, Oldsmobile distributor in the Rocky Mountain territory. The mourners were in a cheerful mood

of befitting grandeur. The following epitaph was read in honor of the well-known departed:

Here lies the body of old man gloom.
The Olds Motor Works has tolled his doom.
He landed here in Nineteen Twenty,
Outstayed his welcome good and plenty,
And hung around 'till he got in the way
Of the business end of a FORTY-THREE-A.

One should not criticize the dead,
But nothing, surely, can be said
Of this poor fish that's worth a hoot
For he wore long crepe and was yellow to boot.
He planned to make an extended stay
Till he stepped in front of a FORTY-THREE-A.

Billy Barnett's chief mourner here.
Come, Bill, let's see you drop a tear.
Who'll drive the hearse? Why, chubby Fred.
He'd drive a bargain with the dead.
Let Mac and Driscoll lay away
The GUY who dared a FORTY-THREE-A.

Brains and Courtesy Pay

Does courtesy pay? A. H. Sowers, Lexington distributor in Boston, knows it does. Swinging around in his car a few days ago he noticed a man and

woman looking in his salesrooms window. They started to go in then hesitated and passed along. Figuring that they were a bit timid he decided to remedy that for the future. Shortly afterwards there appeared in his window a small, neat card reading:

Thank you for stopping to look at
THE LEXINGTON MINUTE MAN SIX
There are many things about this
motor car that we should be glad to
explain to you. Stepping inside will
not subject you to annoyance by insistent, overzealous salesmen, for we wish to emphasize our appreciation of your courtesy in taking the time to note what Lexington cars look like.

Within a week while a salesman was booking an order for a Lexington Coupe, the lady accompanying the buyer, smiled as she said: "We could not resist that little card in the window. It seemed so assuring. And you may charge up part of the commission to whoever wrote it, for he earned this sale from it."

This List Will Be a Time Saver When an Electrical Problem Comes Up

The following electrical systems have been described in previous issues:

Car	System	Issue	Car	System	Issue
1921 Ford	Ford	Nov. 10, 1921	1921 Chevrolet FB & 4-90	Auto-Lite and Remy	Mar. 9, 1922
1921 Dodge	North East	Dec. 1, 1921	Maxwell 1920, '21, '22	Simms-Huff & Auto-Lite	Mar. 23, 1922
1921 Buick	Delco	Dec. 15, 1921	1921 Oldsmobile Six, 37-A and B	Remy	Apr. 13, 1922
1921 Overland	Auto-Lite	Dec. 29, 1921	1921 Oakland, 34-C		Apr. 27, 1922
1921 Studebaker	Wagner and Remy	Feb. 16, 1922	1921 Oldsmobile, 4 & 8 cyls.	Auto-Lite and Remy	Apr. 27, 1922
			1921 Hudson	Delco	May 18, 1922
			1921 Reo and Speed Wagon F	North East	June 8, 1922
			1920, 1921 Chalmers	Auto-Lite and Remy	June 29, 1922
			1921, 1922 Chandler	American Bosch	July 13, 1922
			1921 Nash cars	Wagner	July 27, 1922

Gray & Davis and Remy Electrical Systems on 1921 and 1922 Paige Cars

A Simplified Analysis That Will Cut the Time Required for Locating Troubles to the Minimum

ARTICLE FIFTEEN OF A SERIES BY A. H. PACKER

PAIGE cars for 1921 and continued for 1922 were of three models known as Model 17-20 or the 6-66; also model 15-19 or the 6-42 and 6-44. As the 6-42 and 6-44 are identical as far as the electrical system is concerned, we will refer to the 6-44 only in this discussion, when referring to the lighter car.

Wiring Diagram Variations

The wiring diagram for the 6-66 model with Remy Generator and Starting Motor is shown in Fig. 1.

With the use of the Gray and Davis system which was used in the early part of 1921, the wiring is the same except for the substitution of the other generator, which had the cut-out mounted on it, doing away with the cut-out on the dash. Details of the Gray and Davis generator are shown in Fig. 5 while the cut-out is shown in Fig. 7.

THE 6-44 MODEL has practically the same wiring as the 6-66 except that no tonneau light is used, and the battery connection to the ammeter comes from the battery side of the starting switch instead of direct from the battery, this being a detail difference rather than an electrical one. Some of the 6-44s also had the side lights operated by a separate switch instead of by the main Ignition and Lighting switch and in this case there was no side terminal on this switch and the extra switch was connected to the side of the ammeter away from the battery, the other switch terminal going to the side lights. In this case there was no fuse in the side light circuit.

Starting Circuits

On both models the current for starting comes through a heavy cable to the starting switch, and from the switch to the starting motor which is located on the right side of the engine. On the 6-66 a double reduction bendix drive is used to the flywheel, while on the 6-44 a single reduction drive is employed. Internal circuits of the Remy starting motor are shown in Fig. 3, these being similar in the Gray and Davis Motor, but in connection with these circuits, it must be noted that the two models require motors of different rotation.

The difference in direction of rotation required is due to the double reduction drive on one model and the single reduction on the other, so that the connections to the brushes may be exactly as shown in Fig. 3 or just the reverse. That is the upper left hand brush and the lower right, may be grounded and the others connected to the field leads, instead of connecting as shown. This change is easy to make when working

on one of the starting motors, but the direction of rotation should be carefully checked as soon as the motor is assembled, for if the rotation is wrong the Bendix pinion will throw out of mesh instead of going in, and even if it had the ability to go in, would crank the engine backward.

Locating Starter Trouble

While it is very easy to remove the starting motor on Paige cars, it is usually better to make sure where the cause of starting trouble may be before taking off the motor. This can usually be done by watching the action of the head lights as the starter switch is operated, so that with these turned on the electrician should step on the starter pedal, and see what happens.

LIGHTS GOING OUT show a poor connection in the starter circuit which is usually at the battery terminals or where the starter cable is grounded to the frame of the car. A rough check to find the location of such a condition can be made by allowing the current to flow for a few moments and then quickly feeling of the various connections in the starter circuit as a high resistance due to corrosion will make itself known by the heat generated, the poor connection being warm while the others are cool.

A more accurate and satisfactory method, however is to use a voltmeter connected across the suspected contacts. One lead of the meter for example could be connected to the frame of the car and the other to the cable terminal that is supposed to be firmly connected to the frame. Now the mechanical connection may be good, but it does not prove that the electrical connection is right, for it is possible for corrosion to form and nearly insulate connections that appear to be mechanically good. For this reason the above connection is suggested, and with the voltmeter leads in contact as indicated, the starter switch should be operated, and the voltmeter action observed. With a good connection, there will be no deflection of the needle or else a barely perceptible movement, but if the contact is poor, the voltmeter may read a volt or two or even more. This is certain indication that the trouble has been located, the remedy being to remove the terminal and sandpaper the affected surfaces. Where the trouble is due to the connection at the frame of the car, a good connection can be made by cleaning up and tinning the frame of the car, before the terminal is again fastened on. Tinning is merely the application of a coat of solder to the iron surface. This not only gives a good connection but keeps the iron from rusting at

Fig. 1—Wiring Diagram of the 1921 Paige, Model 6-66

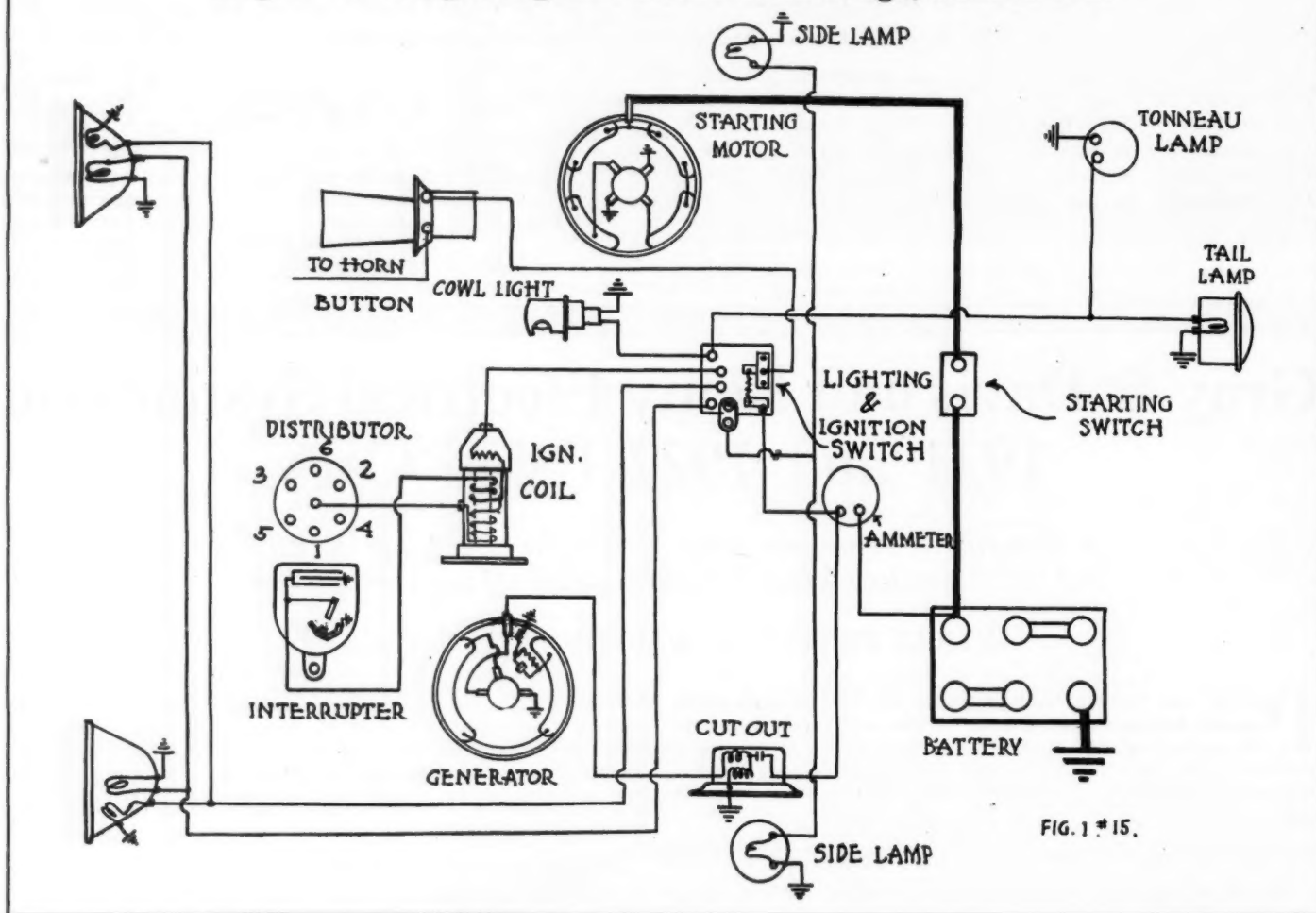


FIG. 1 #15.

that point. In similar manner the connection of the terminals to the battery posts can be tested. LAMPS STAYING THE SAME shows that there is no current going to the starting motor and this may be either due to trouble in the motor or to trouble in the outside circuit. The exact location of such a condition can easily be located with a voltmeter, also. In this case it will be connected from the frame of the car to various parts of the starting circuit, while the starter switch is held down.

For example we might start at the battery where a full battery voltage reading should be obtained. The next test would be made from ground to the battery side of the starter switch, then at the other starter switch terminal and finally at the motor terminal itself. For example if there was a reading on one side of the switch and not on the other, the trouble would obviously be in the switch, while if the readings were obtained all the way up to the motor terminal the open circuit would be in the motor itself. In this case the cause would most likely be worn brushes and commutator burnt, due to long use, the remedy being to turn down the commutator and install new brushes. For a general rule in locating trouble in this way we might say that the open circuit is BETWEEN THE LAST PLACE WHERE A READING IS OBTAINED AND THE FIRST PLACE WHERE WE GET NO READING.

LIGHTS GETTING DIM show either that the battery is low or that the starting motor is drawing an excessive current due

possibly to a ground in its windings. The first check should be made on the battery however. This can be done with a hydrometer, readings of 1280 showing that the battery is charged, while readings of 1150 show it to be discharged.

High gravity readings are not always reliable if the history of the battery is not known as it may have been doped up with heavy acid or other compounds which affect the gravity readings. For this reason it is also well to check the battery by using a 0-3 scale voltmeter, taking readings across each cell, while starter current is flowing. These readings with a good battery fully charged should be about 2 volts at each cell, while if the battery is pretty well discharged they will be about 1.7 volts.

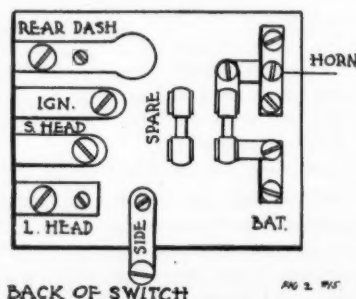
It is also possible however to get a low reading in this test from a good battery if there is a short in the motor or else a mechanical bind which causes it to draw an enormous current from the battery, and the only way to check this is to use a high reading ammeter, say one with a 0-500 scale, in order to read the starter current. As this current with a good starting motor and an engine in good running condition should be not much more than 150 amperes, it is evident that current in excess of 200 amperes is a strong indication of either electrical or mechanical trouble in the starter itself.

Removing and Repairing Starter

On the 6-66 model the starter is removed by taking out one large cap screw which goes down through the flywheel housing into



FRONT OF SWITCH



BACK OF SWITCH

FIG. 2 #15

Fig. 2—Ignition and Lighting Switch, 1921 Paige

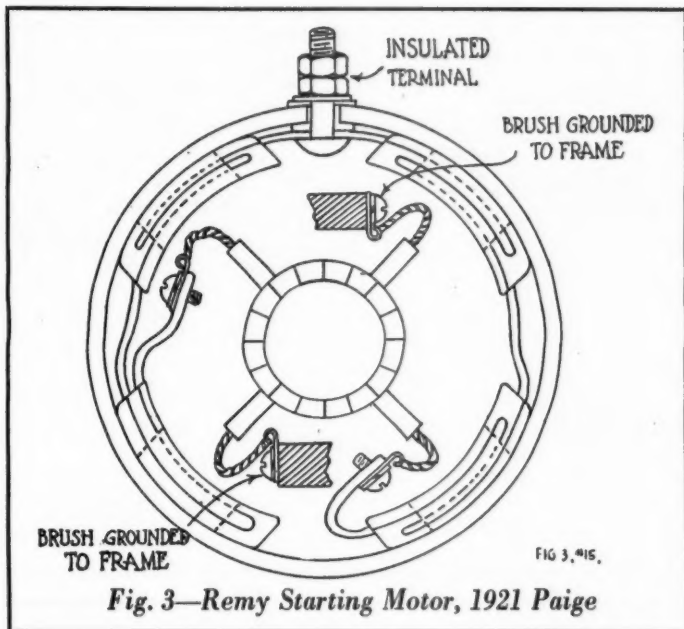


Fig. 3—Remy Starting Motor, 1921 Paige

the starter end bracket. On the 6-44 the flange mounting is used, the removal of three bolts being required. In either case the job is rather simple, however.

Most starter troubles such as worn brushes, burnt commutators, etc., can be determined by inspection, but it is also well to test the fields and armature for ground while the starter is apart. This can be done with 110 volt leads from a lighting circuit, one of the leads, having a lamp in series with it, so that when the ends of the leads are touched together the lamp will light. The ends of these leads or test points can then be used, one connected to the armature shaft and one to the commutator to see if the armature is grounded, while in testing the fields, one test point can make contact with the frame of the machine and the other with the terminal of the motor. In either case the lamp lighting shows a ground. In making tests of this kind, care should be taken to see that no natural grounds, such as the connection of the brushes to the frame of the machine, are left on, as these would give a ground test when no defect exists.

Internal Generator Circuits

Internal circuits of the Gray and Davis Generator are shown in Fig. 5, this being a four pole machine, with two main brushes and a third brush. The field circuit is from the grounded main brush at the left, to the upper field coil, then around to the left through all of the field coils in series, and through the field fuse to the third brush. This can be shifted by means of a screw on the outside of the end bracket. This screw operates a pinion which meshes with a toothed sector, which shifts the third brush. Turning the screw to the right or clockwise will move the brush in the other direction, or counter clockwise, thus increasing the charging current, the reverse action having the reverse effect.

The field fuse does not protect the light or the wiring on the car, but is for the purpose of protecting the generator from burning up, in case the connection between it and the battery should be broken while the engine is running. The connection of the generator to the battery holds its voltage down to about battery voltage, but if disconnected, this regulating feature is missing, and the entire output of the machine goes through the field windings, overheating them and the armature as well. With the blowing of the fuse under such circumstances, however, the field circuit is opened, the generator therefore dead, and no harm results.

Remy Generator Circuits (Fig. 4)

The Remy Generator used in the latter part of 1921 and in 1922 is a two pole machine, and also has third brush regulation, but has in connection with the field circuit a thermostat which operates to reduce the output when the machine gets hot, this being desirable both from the battery and generator standpoint.

The field circuit is from the third brush to the field coil at the left, then through the coil at the right to the upper contact of the thermostat. Connection is then made through the contacts to the lower finger which is marked "thermostatic metal," and this finger is connected by the tubular rivet which holds the assembly together, to the upper part on which the fuse finger is located.

The small sketch at the upper part of the main sketch in Fig. 4 shows how the fuse is mounted in a small cap, which screws into the end bracket, the installation of the fuse completing the field circuit from the fuse finger on the thermostat to ground, or the frame of the machine. A spring in the fuse cap, insures a firm connection at all times.

The mounting of the thermostat to a portion of the generator frame is by means of two screws, two fibre bushings and two fibre washers, or insulating strips. This insulates the thermostat from ground and forces the fuse to act as the only connection for the field current.

As the generator heats up, the thermostatic metal in the lower finger bends in such a way as to open the contacts, so that the field current must now go through the resistance wound on the mica strip. This resistance reduces the amount of the field current thus weakening the generator and causing it to deliver less current to the battery. This action will also cause the generator to give out more charging current in winter than in summer, which is a desirable characteristic.

Gray and Davis Cutout

This cutout is shown in Fig. 7 and is mounted on the generator, being held by projections of the main brush studs which not only hold the cutout on but also serve to carry the live armature current to the cutout, and also to connect it to ground for the return connection of the shunt winding. The lower sketch in Fig. 7 shows a side view with the general nature of the construction, also the circuits, while the upper sketch gives the plan of the base, with the circuits of the windings and contacts, but the actual construction is not shown in the upper sketch.

Remy Cutout

The Remy cutout is not put on the generator but is mounted on the dash, the circuits and construction being shown in Fig. 6. Current from the generator goes through the heavy winding to the frame of the cutout and then through the fine

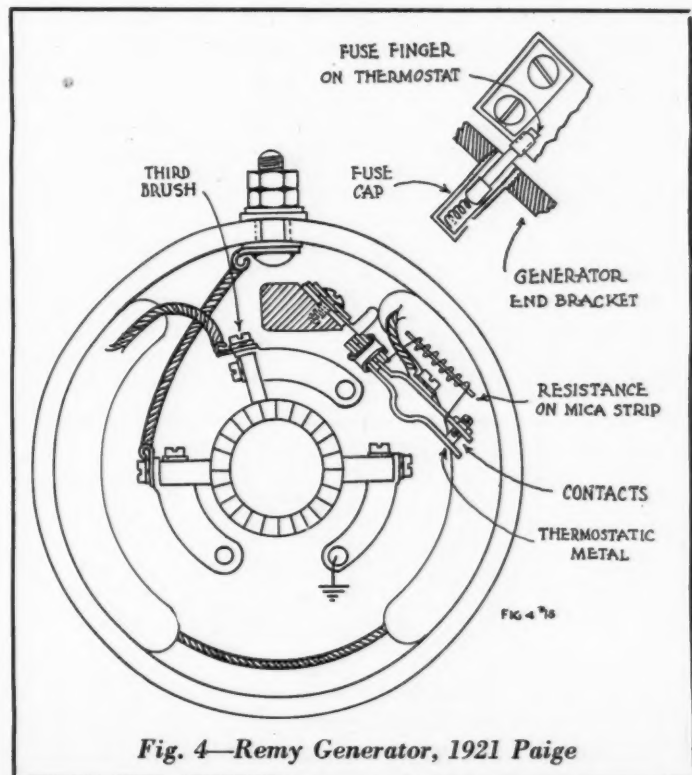


Fig. 4—Remy Generator, 1921 Paige

winding to the base which must be grounded to give a return circuit to the generator. The magnetic effect of the fine winding, when the voltage is about 7.5 then causes the points to close, connecting the generator to the battery, through the ammeter.

Shooting Generator Trouble

Shooting generator trouble on the car can be easily done by operating the cutout points, while watching the ammeter. If in either generator it is possible to lift the grounded main brush, there will still be a circuit through part of the armature and the field windings to ground, so that two or three amperes showing on the ammeter will indicate that there is a circuit through the fields. The main brush can then be dropped again onto the commutator and the cutout points again held down, and the reading on the ammeter should now be from 15 to 20 amperes due to the extra current taken by the armature.

With the field and armature apparently O. K. the cutout points should be still held together and the engine started, and as the speed increases, the discharge current on the meter should decrease to zero and become a charge current of from 12 to 20 amperes depending on the third brush setting and on whether the car has the Gray and Davis Generator or the Remy Generator, the higher output being permissible for the Remy.

An open field circuit on this test will usually have the effect of keeping the discharge current at practically a constant value in spite of the engine speed, while a defective armature will usually cut the discharge current to about zero but will fail to send the ammeter needle over to the charge side of the scale.

Blown Fuse

If the generator does not generate, the fuse should be examined and if found to be burnt out, a temporary connection can be made with a screw driver or piece of wire, just to see if the generator is working. Nothing but a five ampere fuse should be used for permanent service. If a field fuse is found to be burnt out it is a strong indication that there is a loose connection or that the battery terminals are corroded, the location of a loose connection that would blow the fuse being in the circuit from battery to generator, and such a condition should be found and corrected before the new fuse is installed.

Some of the Remy generators used did not have the fuse in the field circuit, being equipped with the thermostat only and on this type, the breaking of the generator to battery circuit would result in a burnt out resistance in the thermostat. To test for such a condition the engine should be run and a screw driver used to short from the field on top of the thermostat to the frame of the machine. If this causes the generator to work, it indicates the trouble is as above indicated.

If the generator is working all right when the cutout points are held closed, but will not cut in by itself, it shows either that there is a poor connection in the generator field circuit, or that the cutout is defective, or that the connections to the cutout are poor.

The generator can be checked with a voltmeter, with the engine running and if it shows a voltage of 8 or more it is O. K. If the cutout does not close, voltage should be taken from its "GEN" terminal to its base, and if there is no voltage

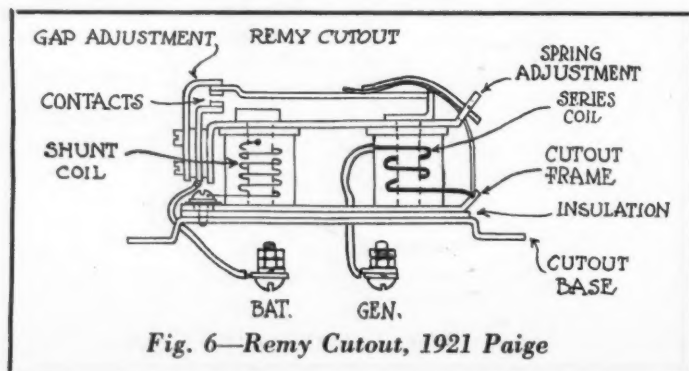


Fig. 6—Remy Cutout, 1921 Paige

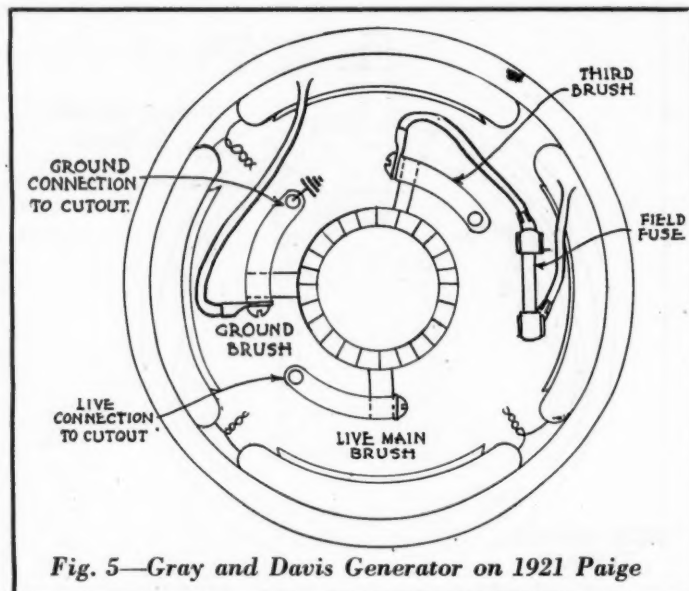


Fig. 5—Gray and Davis Generator on 1921 Paige

here the fault is in the connections or the base is not grounded. If the voltage at the cutout is the same as at the generator, then the cutout is defective, the winding being possibly open, and a new cutout should be tried.

On the Remy system where the cutout is separate the winding can be easily tested by connecting the voltmeter in series between the generator and cutout, and if there is no reading with the engine running, then the fine winding is open, assuming voltage is obtained at the cutout as previously mentioned.

Lighting Circuits

The arrangement of the Lighting and Ignition switch is somewhat novel, the front part of the switch being mounted on the cowl board while the operating part is on the front or engine side of the dash, a pipe connection extending from the cowl to the dash for the purpose of operating the switch. Fig. 2 shows both the front and back of the switch, the connections made being as follows:

DIM	Tail and Small Heads
ON	Tail and Large Heads
SIDE	Tail and Side Lights

In all of these positions the operation of the tail light is accompanied by the operation of the cowl light and the tonneau light when such a light is in use. On 6-44 model cars that had separate switch for the side lights, there was no SIDE position on the main switch and no SIDE terminal on the back of the switch.

Operation of the key in the center of the switch connects the "BAT" terminal directly to the "IGN" terminal, but operation of the lighting switch gives all the circuits through the fuse shown on the back of the switch. The second fuse is a spare for use when the other burns out, but should not be put in service until examination has indicated there are no grounds in the lighting circuits.

Locating a Grounded Circuit

In case the lighting fuse has blown, it is necessary to find the grounded circuit and correct the trouble before it is safe to put in a new fuse. To merely hunt for the trouble by inspecting all the wire is a big job because there are so many places where the wires are hard to trace. For this reason it is well to first find which circuit is at fault, and then inspect it carefully to find the exact location.

To pick out the circuit that is causing the trouble it is well to turn off all the lights and remove the lamp plugs from their sockets. A test lamp can then be used at the back of the ignition switch connected from the "BAT" terminal to the various lighting terminals, and if the lamp lights up at the "SIDE" lamp terminal for example, it shows this to be the defective circuit. If the lamp does not light at any of the lighting terminals it is possible that the trouble is in one of the lamps, so the plugs can be replaced and the test repeated.

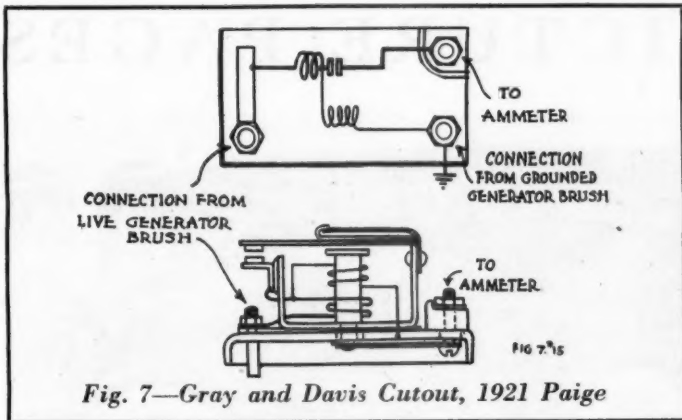


Fig. 7—Gray and Davis Cutout, 1921 Paige

Now suppose that the test lamp is connected from the "BAT" terminal to the "L. HEAD" terminal and the large heads and the test lamp both light up but are somewhat dim, due to the fact that each is acting as a dimming resistance for the other. This would show the circuit to be O. K. Suppose however that with this same connection that the test lamp would be full brightness, but that the two large head lamp bulbs should be out, it would then show that these were grounded, and that current was flowing through the test lamp only, and back to the battery through the defect in the circuit. The location of trouble of this kind is likely to be where the wire has been rubbed by metal portions of the frame, or it may be in the lamps themselves due to stray strands of wire coming in contact with the shell of the lamp.

Ignition Circuits

Current for the ignition comes through the switch to the "IGN" terminal as previously mentioned, and then flows to the top terminal of the Ignition coil. Inside the coil the current goes through a resistance or ballast, and then through the primary or magnetic winding and out to the interrupter, where the circuit is made and broken by the action of the contacts while the engine runs. At each break of the circuit, the iron core of the coil is demagnetized, this action being made very sudden due to the effect of the condenser in killing the arc at the interrupter points, and this sudden demagnetizing action produces the high voltage in the secondary winding which sends the sparks to the spark plugs.

Shooting Ignition Trouble

The most likely cause of Ignition failure is a broken or loose connection in the primary circuit which carries the battery current, and the easiest way to check this is by watching the ammeter, while the starter is cranking the engine. The making and breaking of the interrupter points should cause a flickering current of about two amperes to flow through the meter, and if no current is observed, the circuit is open while if the ammeter shows about five amperes steadily it shows that the interrupter points are most likely stuck together, although it is possible that the wire from the coil to the interrupter is grounded.

If the circuit is open a test lamp can be used to locate the trouble in the same way that the open in the starter circuit was found.

After the primary circuit has been checked and found O. K. the next thing to test for is condenser trouble, and with the interrupter points open, or blocked apart with a piece of paper or piece of a match, the ignition switch can be turned on and off a few times while the ammeter is carefully watched. A slight flicker of the needle when doing this would show a leakage of current through the condenser, which would indicate that it was defective and that a new one should be used.

Timing the Ignition

A more accurate way to test for condenser trouble is with a voltmeter connected in series with the primary circuit, as the ammeter on the car is not very sensitive and may not show the slight leakage current that the condenser may draw. With

the primary circuit and the condenser O. K. the only thing that will keep the coil from giving good sparks is a defective winding in the coil itself and the only remedy for this is to use a new coil there being no test for such a condition.

To set the engine on firing dead center for the No. 1 cylinder the priming cocks should be opened, and the engine turned over until the No. 1 cylinder comes up on compression, which can be determined by placing the thumb over the No. 1 priming cup. The exact position can then be determined by watching the flywheel for the dead center mark, and the flywheel should then be turned about $1\frac{1}{2}$ inches farther for the retard spark position. Another way to check the dead center position is by the No. 6 exhaust valve which just closes as the No. 1 cylinder is on dead center, ready to fire.

After the engine has been set, a little past firing dead center, the spark advance lever on the steering column should be set in the retard position, and the distributor arm located under the wire to the number one spark plug. The interrupter points should now be just ready to open, and slight changes in the timing adjustment can be made by loosening the spark control lever on the ignition unit itself, setting the unit in the right place and tightening the lever again.

This ignition outfit has a centrifugal device built in it which advances the spark with increase in speed, so that the spark lever on the steering column is only used occasionally or to set the timing where it is most suitable for the operation of the engine.

Bagging the Tourist Trade

Through the spring days of 1922 the proprietors of the Central Tire Shop, Walla Walla, Wash., stood in the doorway of their establishment and watched hundreds of dollars worth of potential business whirl past them. The business lay in the worn, shredded tires on the wheels of the tourists' automobiles. These tires, the tire men knew, would have to be repaired or replaced soon. They decided that if ordinary sign-board advertising was not effective in bringing travellers to their doors other methods must be found.

They have found the method, one that operates effectively at very little expense and adds a volume of business that, to the average small tire shop, is very welcome.

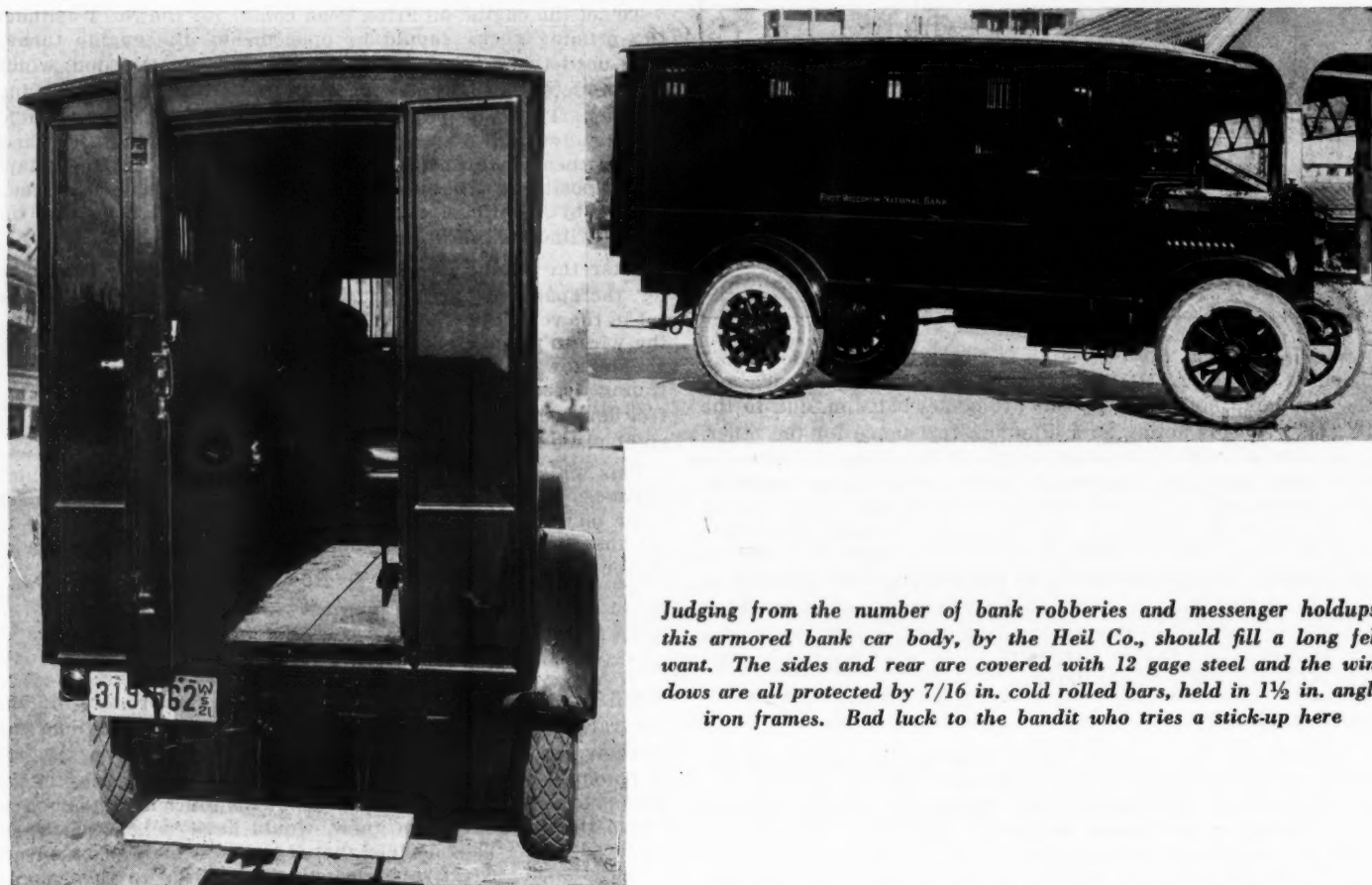
A representative of the shop, a tire expert, visits the Walla Walla public tourist camp early every morning. His first duty is to make a general inspection of the tires on the large number of transient cars encamped there, discovering cuts, sand blisters, side wall weaknesses and any of a hundred defects readily noticeable to the practiced eye. He then informs the car owners of the defects of their tires, suggesting the most rapid and effective method of repair. With him he carries a supply of small hand-bills with a schedule of tire prices and repair rates offered by the Central Tire Shop.

At the same time he suggests repairs—and he does this only when he believes they are legitimately needed—he also tells the prospective customers on the speedy service which his shop can afford them. To most tourists saving of time is a vital necessity; therefore, when he says he can remove tires in need of repair, put them in the small service truck he drives, take them to the shop and return them by the time the campers have packed their tents and finished their breakfasts, he usually is awarded the business he seeks.

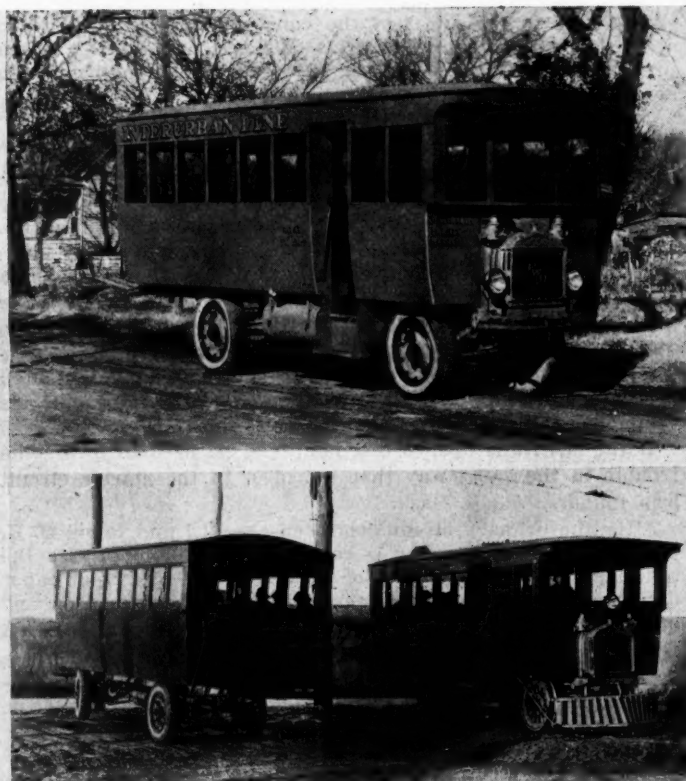
As a result of this service, the Central Tire Shop is selling about three casings a week to tourists, an item of no small importance to a comparatively small establishment in a town of Walla Walla's size, 15,000. In addition to the sale of casings a large amount of repair work is also obtained, so that as the tourists whirl past the shop door the proprietors no longer feel that their share of the business is being carried to the next town.

The Central Tire Shop carries two lines of casings, one of the best grade and the other of a less expensive grade, which they are able to sell at a low figure through special arrangements with the manufacturers. In this way they are ordinarily prepared to satisfy any tourist who needs new casings.

MOTOR AGE'S PICTURE PAGES



Judging from the number of bank robberies and messenger holdups, this armored bank car body, by the Heil Co., should fill a long felt want. The sides and rear are covered with 12 gage steel and the windows are all protected by 7/16 in. cold rolled bars, held in 1½ in. angle iron frames. Bad luck to the bandit who tries a stick-up here



Four Wheel Drive Auto Co.'s cars equipped to run on the city tracks of Manhattan, Kansas; their seating capacity is 32. At the end of the line they make connections with suburban cars of the same kind, running on pneumatics. City cars average 95 miles and suburban 150 miles a day

OF AUTOMOTIVE INTEREST

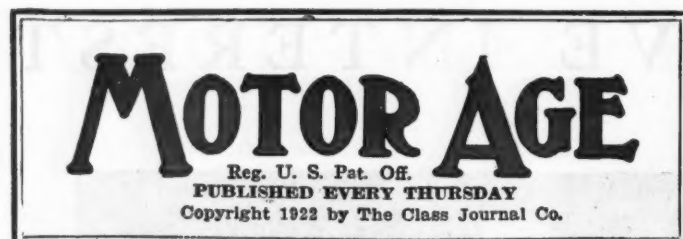


This unusual night photograph was made at the Igou Motor Company's salesroom, St. Louis, on the occasion of the opening. This is a \$60,000 establishment several miles from the St. Louis Motor Row

One of the hundreds of industrial uses of the tractor shown in the Ford day parade at Chicago Aug. 10. Fair young women were in the drivers' seats of many of the vehicles. Actual operation of the tractors industrially and agriculturally was demonstrated on a large lot near the entrance to Chicago's Pageant of Progress



The Igou Motor Co. must have staged their opening on this Moon car salesroom very well, to judge by the floral offerings. This salesroom is very near the American League baseball park in St. Louis, where the town is baseball wild, for obvious reasons. One diamond shaped floral offering in the picture was the gift of the Browns and one of the baseballs in it was the one that Ken Williams knocked for his first home run this season, the other is autographed by each member of the Browns. Of course a lot of people came to see this decoration



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A Hint On Letter Writing

THERE is a very strong present trend on the part of persons writing letters to MOTOR AGE and other large institutions to address this letter to some individual. In fact, MOTOR AGE answers many questions of persons who want to know to whom letters should be addressed in certain factories.

Invariably, when the object of the request is made known, the advice is to address the letter to the manufacturing firm, and let the mail clerk there decide to whom it should be referred. It is our own experience that most of the letters received from volunteer correspondents and addressed to the attention of an individual, are wrongly addressed. In most cases the correspondent has merely served to delay the reply to his letter, if the letter is referred to the person named.

Changes in manufacturing establishments are taking place constantly. The correspondent who pins his faith on the personal reference in his letter is more than likely to select a man who has been off of a job for days and perhaps months. In that case, the correspondent is likely to do two things: Offend the man who was promoted by not knowing his forward step; and make the man who has taken the job feel that he is an unknown quantity. In either case, the feeling at the other end of the line does not help the attitude toward the latter.

This suggestion does not, of course, affect a reply being directed to the individual with whom a correspondence has been established. Such references always hasten the handling of correspondence.



There is a new crop of motor club and buying club fakes in the country. Do your share by warning your members against them.



An active state dealer association is an insurance against unjust laws and taxes.



Organization Objectives

LAST January the National Automobile Dealers' Association put forth an original business idea and the acceptance of this idea has been an interesting study. It had been found by experience that the great mass of automotive dealers could not see the benefit to them in a national organization. The benefits of this organization had been notable, but chiefly indirect. The N. A. D. A. has saved the dealers of this country many dollars and much trouble. These savings had been chiefly averting threatened expenses, such as taxes and penalties, and most dealers could not see that they had been benefited. As a result, the N. A. D. A. had to lean heavily on a few sustaining members to carry on the operation of the association.

The new idea was to select only such dealers for members as could qualify under a very high code and to give to these men not only the service that had been rendered, but an exclusive and direct service that comes from a high business rating. The benefits alone justify membership.

An objection, however, has come from a curious source. A number of dealers who are undoubtedly eligible have held back from membership because the N. A. D. A. would not do, as in former years, take in the entire membership of the local association, regardless of the standing of the dealers. This loyalty is excellent in spirit, but it does not take into account the different objectives of the two organizations.

The local association is calculated to bring about a proper co-operation for the benefit of local problems, while the new idea of the N. A. D. A. is to set, by example of the benefits reaped by the members, a goal for other dealers to work to. Each organization has its place, especially as the N. A. D. A. will continue to act in a protective way for all dealers.



Perhaps a word of caution from the salesman to the new driver will save a life.



Courtesy is the cheapest article in your shop, and one of the best assets.



Looking Ahead As to Laws

IN practically every state campaigns are in progress to decide the membership of the legislatures that will meet next winter. These legislature sessions doubtless will be interesting to automotive men. There is no reason to believe that the assaults on the automotive vehicle from a taxation standpoint will cease. It is to be expected that the automotive interests of the country—and this includes dealers and owners as well as manufacturers—will be better organized and will get busy with an educative cam-

paign as early as it is possible to identify the future law-makers.

As a matter of fact, this educative campaign should begin now and should be carried forward during the campaign and if the candidate for the legislative office gives evidence, as candidates so often do, of hostility toward this industry and its products, those interested in automotive affairs should be organized against this man.

The enactments of the state legislature usually affect the automotive vehicle owner directly. Usually a new tax is a direct levy on the vehicle owner and in the case of a levy on trucks and busses, it is an indirect levy on necessities, as all sorts of commodities are hauled in trucks and the additional tax is passed on to those who buy these products. The same is true of excess taxes on busses. The owner of the bus cannot pay these taxes unless he collects them on his fares.

There is very strong evidence that the railroads are taking up the legislative battle against automotive vehicles under the wrong impression that they can gain by force what they have lost through fair competition. The usual plea that the trucks and busses destroy the highways is not well founded and legislative committees with whom this question is raised can easily get arguments for reply.

The big point is that the dealer is the representative of the automotive industry in his community, aside from the manufacturing districts, and he should organize for the coming battle.



How many golf courses in your community need tractors as lawn mower and roller power?



Does your street car company need any busses to supplement their service?



A Word About Safety

THE automotive safety effort is attracting increasing attention from the men connected with the automotive industry, and it is well that it should. Accidents are becoming a sales resistant and unless something is done they are likely to arouse considerable opposition to the use of motor trucks and busses. A part of this movement that has accomplished something and has a great future is the organization of schools for motor truck drivers by business organizations, such as chambers of commerce. In this connection, the N. A. D. A. has prepared some leaflets on truck driving that dealers should help to circulate.

Dealers in all automotive vehicles should identify themselves with any movement of this kind, not only because it is a worthy work, but because it is of direct benefit to them. There is hardly a city of 100,000 population that is not struggling with an acute automotive traffic problem. The great extent of the adoption of the individual means of transportation—such as is represented by the automotive vehicle—has taken the city government officials unawares and they have to a large extent ignored the complexities of the situation until it has become acute.

Automotive dealers can be of vast assistance to their city officials in this work if they can make for themselves an opportunity to get into the consultations. It is their duty to make this opportunity.



"Full service from your car" is a fine advertising line.

Don't copy the other dealer's methods, get a new line of thought.



Do You Run Your Business Or Does It Run You?

A GOOD electrician was one time employed in an electrical service station, where it was his duty to meet the customers, generally supervise the jobs and occasionally help out on some jobs that presented unusual difficulty. In connection with work on the ignition devices, he usually did the work of timing the engines himself, as he felt that this important work should not be handled by less experienced men.

The time came, however, when personal matters made it necessary for him to be away from the shop for several days, and in his absence jobs were timed by other men, and, being unfamiliar with this part of the work, a number of mistakes were made. When the foreman returned, he was inwardly gratified to hear of the mistakes, for it gave him an idea of his own importance, also the impression that he was quite invaluable to the successful operation of the business.

Quite different from the valuation placed on this man by himself the way a certain executive had of rating his responsible men. His test was to call them without warning to his office, hand them sealed orders and expense money and send them off on some more or less important trip, merely for the purpose of observing how well or how poorly the department in question could operate with the directing head away. If the department went to pieces, he considered that instead of the manager being invaluable, that exactly the opposite was the case, for he had failed to get his business machine to the point where it would operate without continuous attention. If, on the other hand, the department could function well, he considered that instead of the director being unnecessary, that he had proved capable of handling some bigger and more important executive assignment.

Owners of repair shops and automotive dealers the world over will be found to fall into these two classes, one where some need of the shop must be personally handled every minute of the day, the other where the owner can be away for days or weeks without a noticeable change in the way the business is conducted.

The latter condition, which is, of course, ideal, is attained only by turning over to some employee one duty at a time until the management of the business can in no way be considered a burden. This does not mean letting everything be done by subordinates without knowledge of what they are doing, but it does mean relief from the actual work, while still retaining a knowledge of every detail job that is performed.

To the shop manager who is thoroughly familiar with the detail mechanical and electrical processes used, it is often difficult to relegate the seemingly important duties to others, but if this is combined with some measure of instruction and then followed up to see that the teaching takes, it will be found that the problem of getting the right man for the shop will also have been solved by the slow but sure process of making them.

The owner will then have opportunity to devote his time to the promotion of his business.

Schwab Takes the Wheel At Stutz

Steel Manufacturer to Guide Destiny of Indianapolis Firm

Visits Factory on Acquiring Control and Announces Reductions— Personnel Unchanged

INDIANAPOLIS, Aug. 15—Charles M. Schwab, president of Bethlehem Steel, who obtained control of Stutz Motor Car Co. of America a few days ago, announced here Friday that he will be actively interested in the Stutz management, but that the personnel of the Stutz organization will not be changed. A program of enlargement and expansion is said to be assured. Coincident with the visit of Schwab and his announcement regarding the organization of the factory forces, a revised schedule of prices for Stutz cars was also made known, with price reductions ranging from \$200 to \$500.

The roadster is now \$2,450.

Following is the new price list:

	Old Price	New Price
Coupe	\$3,990	\$3,490
4-pass sport	2,990	2,790
6-pass. phaeton	2,990	2,640
Roadster	2,950	2,450

The price reductions carry with them full protection for all dealers on all models they now have on hand.

William N. Thompson, president and general manager, will be continued, Schwab said, as will the entire factory organization. Schwab said that the men who have guided the company through the recent uncertainty of the motor car industry are best qualified to handle the new control.

"I am in entire sympathy with Mr. Thompson and his associates and have complete confidence in them," he said.

"It is farthest from my thoughts to change the personnel. I hope the relations will be as happy as in all the industries and corporations with which I am associated."

In his statement Schwab said: "It is not as if my associates and myself were acquiring a new property in the automotive field and making our debut in the motor car industry by acquiring control of the Stutz. We have long been interested in the company in a substantial way. What is more natural that under the circumstances we should desire to control the property as we do in the case of all the other properties with which we are identified.

Our plans for the Stutz simply embrace a continuation of the business on a basis that will permit it to proceed as it deserves to progress—to make the most of the possibilities which lie within its range of ability. We regard the Stutz as a valuable property—one that has potential possibilities that recom-

mend it as deserving of the best thought and effort that can be put forward in its behalf. We are going to develop the Stutz along sound, substantial lines. We intend to make it attractive to the trade.

"Although the Stutz company has never been embarrassed so far as its finances are concerned, and at present is in one of the healthiest conditions of any company in the business, in order to enable it to go forward at once with the development that we have planned for it, substantial finances have been provided which will be placed at the disposal of its executives to carry on their work.

"Though I have been associated in my career with some motor car enterprises from a different angle, this is the first time that I have applied myself actively to the management of a company. I have been here many times and have studied the Stutz. I know the men who are with the Stutz, I have been in a position to watch them proceed. I have the sincerest admiration for their work, and I am convinced that if these Indianapolis men cannot put the Stutz where it belongs, there is not a group of men in the country who can do it. Mr. Thompson will continue in full control of the policies of the company and will have the entire support of my associates and myself in all that he does, just as every other man entrusted with the development of the company will have our co-operation in every possible way."

DURANT PRICES FIXED FOR YEAR

NEW YORK, Aug. 12—Present prices on Durant four and six cylinder cars are guaranteed until Aug. 1, 1923, by W. C. Durant, who has just advised his distributors and dealers of his decision.

"Our present prices were established when business was at a standstill, with material cost as low or lower than now prevailing," writes Durant. "Durant Motors, Inc., made an absolutely clean start Aug. 1, 1921, with no high priced inventories and no burden incident to war time operations. Other manufacturers, less fortunate, were obliged to liquidate by gradual price reduction and where this liquidation of high priced inventories has been successfully accomplished it has taken several months to reach our prices. We claim no advantage in the matter of material or labor from or after this date, but we do claim simplified design and engineering features, and special merit not found in competitor's lines."

This price guarantee does not apply to others in the Durant line like Locomobile, Flint, Star and the Mason truck.

AMAZON TIRE PRICES REVISED

AKRON, O., Aug. 15—The Amazon Rubber Co. has announced a new lower price list on its tires. The 30 x 3½ fabric lists at \$10.50 and the cord at \$14.50.

New York Sales Affected Two Ways by Lower Prices

Greater Demand for Lines Which Have Been Reduced, But Competing Lines Slow Up

NEW YORK, Aug. 14—Price reductions on several popular lines of passenger cars have had the expected effect in New York, stimulating slightly mid-summer sales of the cars reduced and materially slowing up deliveries in competitive lines.

Coming at one of the slow periods of the year in the Metropolitan District, when a large majority of car buyers are away on vacation, planning to go away or just getting back, the effect of price reductions has not been so keenly felt as it would have been a month or two ago. The lines reduced have made a more than seasonal number of retail sales within the past week, an unusually large number of which were without trades, indicating that the new prices had reached out and brought into the market some buyers who were holding off until the cars they wanted got within reach of their pocketbooks. There has also been quite a bit of improvement in wholesale business in these lines, and particularly there has been an increased demand for dealerships in some of the smaller communities of the territory. This applies especially to two or three cars in the class recently reduced whose dealer organizations had never wholly rebuilt after the stagnation period of a year ago.

In connection with low and medium priced cars whose prices have not been reduced the public has adopted a natural waiting attitude. Some dealers, as well, are looking for reductions on their lines between now and the first of September.

HOW SCHWAB ACQUIRED STUTZ

NEW YORK, Aug. 14—Charles M. Schwab became an automobile manufacturer when he and Eugene V. R. Thayer, formerly president of the Chase National Bank of New York City, secured the controlling interest in the Stutz Motor Car Co., of America from the Guaranty Trust Co. of New York, which has been in power since it bought at auction last week 132,914 1/3 shares of the Indianapolis concern at \$20 a share.

ASSOCIATION SEEKS A SLOGAN

HOUSTON, Tex., Aug. 12—The Houston Auto Trades Assn. is conducting a contest in which a prize of \$20 is to be awarded for the best slogan for the association. The contest will close Sept. 1. The only conditions are that the slogan be short and express the thought that every member of the association is reliable and will satisfy the customer.

Production 1,403,000 for 7 Months

Increasing Shortage of Coal At All Detroit Factories

Ford Company Continues Full Operation, But It Is Unable to Maintain Fuel Supply

DETROIT, Aug. 12—The coal situation continues to be the most serious problem facing Detroit manufacturers. Notices have been issued by the Detroit Edison company and its power producing subsidiaries, that unless a material increase in its coal shipments takes place immediately, it will be compelled to use its fuel for light producing purposes only, and for supply power to companies engaged in the preparation or preservation of food-stuffs.

Under the terms of this notice it is indicated that a shutting off of power to companies other than these will take place within a period of 10 days to two weeks. By this, every company using Edison power exclusively would be compelled to close. The purpose in issuing the notice is to enable manufacturers to make any preparations necessary to meet the situation.

Without Edison power the big car and parts factories with power plants of their own will be compelled to reduce operations, as in most cases the private plants are not equipped to provide power in more than 25 to 50 per cent of requirements. Operations could be maintained in these factories on a reduced basis for several months, dependent upon the amount of coal in reserve. In most cases this represents from two to three months supply.

Ford Motor Co. is continuing full operations in all plants despite the serious shortage of coal in the company's bins at the River Rouge power plant. When this is exhausted the company will be enabled to operate on about 25 per cent of normal capacity on Edison power. When this is cut off the Ford factories at the Rouge, Highland Park and the Lincoln plants will close, sending about 80,000 men into enforced idleness.

The Ford situation is the most serious in the city because the company, owing to the immensity of its operations has been unable to lay aside a sizable reserve. Until the establishment of priorities it had been receiving a fair daily supply over its own railroads but this has since been cut off. Some coal is still coming in but in negligible quantities, practically all shipments since the issuance of the priority order going to meet domestic demand and to utility companies.

Arrangements have been completed between Ford railroad officials and the Chesapeake & Ohio executives, to bring into Detroit all the coal that can be car-

ried with Ford rail equipment, but this supply would be administered by the State coal commission under the priorities established by the Interstate Commerce Commission. Though some of this may find its way into industrial channels it can do so only in the order of distribution established.

In the meanwhile the automobile factories are working on full schedules and there will be no curtailment until the last possible moment. Orders for cars and trucks are continuing steady, showing gains in fact due to recent price reductions and favorable crop conditions. Without the national crisis due to the coal situation there is every reason to believe that normal operation would be continued through the fall and winter months.

REO REDUCES TWO MODELS

LANSING, Mich., Aug. 9—New prices announced by the Reo Motor Car Co. show a reduction of \$100 on the 5 passenger phaeton and \$110 on the 7 passenger phaeton. The price on the two closed jobs remains unchanged. The revised list is as follows:

	Old price	New price
5-pass. phaeton	\$1745	\$1645
7-pass. phaeton	1595	1485
7-pass. sedan	2435	2435
4-pass. coupe	2355	2355

GARDNER ENCLOSED CARS REDUCED

ST. LOUIS, Aug. 12—Reductions of \$200 and \$250 on the coupe and sedan, respectively, have been announced by the Gardner Motor Co. These models now list as follows:

	Old	New
Coupe	\$1295	\$1095
Sedan	1595	1345

The phaeton and roadster prices remain at \$895, the figure which was established six months ago.

COLE ANNOUNCES NEW SERIES

INDIANAPOLIS, Aug. 14—Cole Motor Car Co. has announced a new series, comprising nine models, all more completely equipped than the previous Cole models. The prices on the new line are somewhat higher than on the old line, but the company states that on account of the extra equipment now included as standard, the prices amount to a reduction. Wire, disteel or wood wheels are optional at the prices quoted. Following is the new list:

Roadster, tourster, sportster.....	\$2,685
2 pass. coupe	2,885
Toursedan	2,985
4 pass. coupe	3,385
Suburban	3,685
Sedan	3,685
Berline	3,885

NEW PEERLESS COMING

DETROIT, Aug. 14 — Announcement that a new Peerless car will be brought out within two weeks is made by the Peerless Motor Car Co.

Output This Year Likely to Be the Industry's Greatest

August Figure To Be Less Than July's 246,000 Because of Declining Sales

NEW YORK, Aug. 15—The automobile industry has set another production record. Passenger cars and trucks produced in July numbered approximately 246,000, which is the largest July business and also the third largest month in the history of the industry, the record month having been June, 1922, with 288,000, and the second, May, with 256,000.

The July record brings total production for the year up to 1,403,000 and indicates that 1922 will be the industry's greatest year unless the railroad and coal strike situations, with their effect on supplies of raw materials and general business, exert a serious curtailing influence on manufacturing activities for the rest of the year.

August production is bound to fall below the July record because of the natural midsummer decline in demand, and it may be still further affected by the coal scarcity which is rapidly approaching a crisis in the Detroit district. So far fuel shortage has not curtailed manufacturing, but supplies on hand are being rapidly depleted and prospects are not bright for replenishment unless there is a sudden turn in the Detroit situation. Ford, for instance, is down to a two weeks' supply, but is going ahead on full production pending possible relief. If coal is not made available, Ford and many other large plants will be forced to curtail production within the limitations of restricted power facilities available from Detroit public utilities.

Outside the strike situation the industry is going forward with confidence of a brisk business throughout the remainder of the year, as indicated by the absence of excitement over price reductions in the highly competitive fields, ranging principally between \$500 and \$1,500. It is significant that reductions have been confined almost exclusively to cars in the big production class, none at all having been made by the manufacturers producing cars ranging from \$2000 up. Reductions have been made by manufacturers whose quantity production has enabled them to pass the benefits of manufacturing economies on to the public. There is entire absence of indication that there is to be an epidemic of price cutting, or anything approaching a price war. A contrary indication is found in the fact that Durant Motors has guaranteed prices to Aug. 1, 1923.

Reports from various parts of the
(Continued on next page)

500 Ford Dealers Celebrate Ford Day at Chicago Pageant

Hundreds of Vehicles Appear in Colorful Parade Through Downtown Street

CHICAGO, Aug. 11—About 500 Ford dealers from Chicago and surrounding territory participated in the celebration of Ford day yesterday at Chicago's Pageant of Progress at the Municipal Pier. The day's program opened with a colorful parade in which there were many hundreds of Ford and Lincoln vehicles and was marked by two good fellowship conferences of the dealers and their employees at Congress Hall.

Every Ford agency in Chicago was closed and about 40 dealers and their staffs made up the Chicago contingent of the affair. It took Shoreen of Evanston, however, to win the first prize of \$250 with their tractor-trailer float—a highly colored and much flowered platform which conveyed a very drowsy looking burro which did not seem at all concerned about the sign that was hung on his back reading, "Them days is gone forever."

Nearly 500 vehicles made up the cortege with Mayor Thompson riding in a Lincoln at the head. Pomeroy-Bray, another Ford agency landed up in front with their float, carrying a band. Dealers, salesmen and mechanics marched and the tractor and truck were presented in a hundred different usages throughout.

The key-word of the parade was, "I Can" and after viewing the proceedings, it would be hard to find a thing, commercial or industrial that either the Ford tractor, truck or car could not accomplish.

The line of march was from Eighth street down Michigan boulevard to Elm street and then to the Pier and the Ford Industrial Show which is being conducted just outside the gates of the Pageant. Here, the tractor is put to prac-

tical demonstrations of its various uses on the farm and as a commercial conveyer.

RECEIVER FOR WORLD TIRE CORP.

CHICAGO, Aug. 12—A petition in bankruptcy has been filed against the World Tire Corp., 1508 Michigan Ave., in the U. S. District Court by the Columbia Tire & Rubber Co., chief creditor, claiming \$12,000 due it on goods delivered to the World Company, the Seaman Paper Co., \$200, and F. E. Scott, \$216.

The Columbia company claims that the World firm, realizing its insolvency, undertook to pay off its creditors by favoring the Tire Co. of America with a shipment of goods amounting to \$10,000. E. D. Buell has been appointed receiver. The World Tire Corp. controls a number of retail stores throughout various parts of the country.

COLUMBIA INCREASES CAPACITY

DETROIT, Aug. 15—The Columbia Motors Co. has leased the plant formerly occupied by the Saxon Motor Car Co., here, and will use it to increase production of the Columbia light six and elite models. The new factory adds 130,000 square feet of floor space to the Columbia plant and gives it a capacity of 200 cars a day.

REDUCTIONS AFFECT SALES

(Continued from preceding page)

country indicate that the public has shown a normal reaction to the price reduction announcements. Sales have been stimulated slightly on most of the lines reduced while there is a temporary stagnation in some of the competing lines due to a natural holding off attitude on the part of purchasers. However, there are indications that the public is already beginning to see the reductions in their true light of a passing on of production economies by manufacturers able to do so. The much larger increase on enclosed models than on open cars promises well for fall and winter business.

Promoters of No-Axel Motors Company Indicted for Fraud

Federal Grand Jury Alleges Misuse of Mails in Sale of \$300,000 of Stock Said to be Worthless

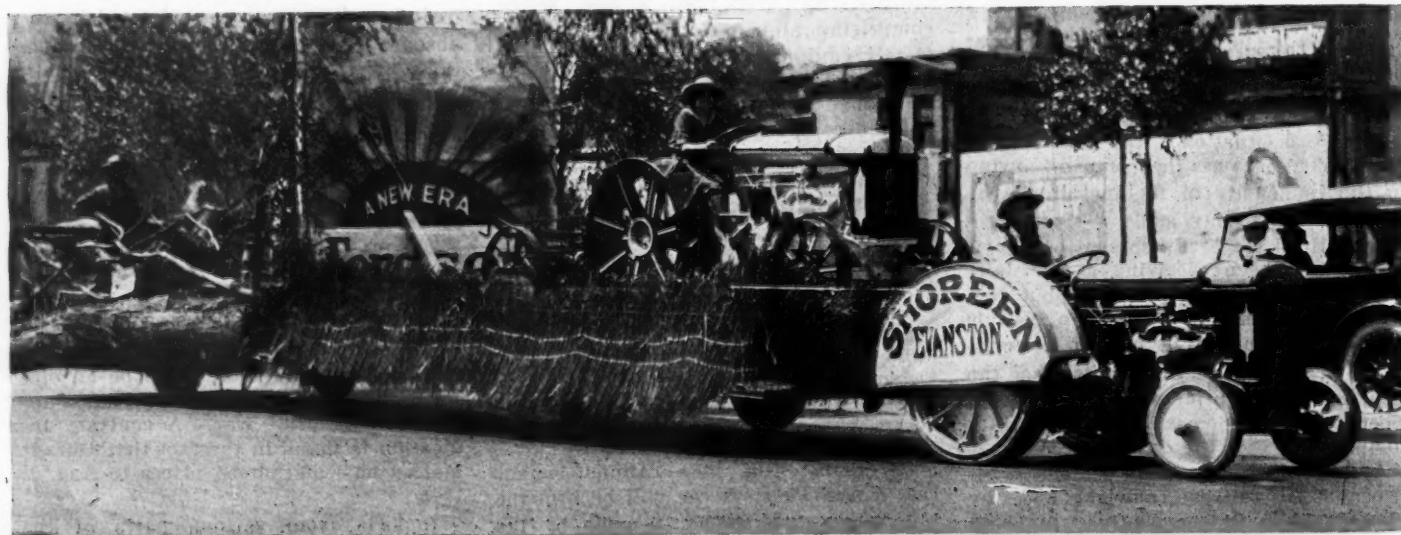
WASHINGTON, Aug. 12—Charged with having sold worthless stock to the amount of more than \$300,000 to Virginia, Maryland and District of Columbia investors, through misrepresentation, 18 officials of the Birmingham No-Axel Motors Corporation were indicted by the federal grand jury, on a specific charge of violation of federal statute No. 215, involving misuse of the United States mails.

Those indicted are: George B. Mechem Sr., George B. Mechem Jr., Ida M. Mechem, Vance W. Mechem, Samuel A. Carlson, Thomas E. Dicken, Harlan Van Wyck, C. A. Rye, Martin Linquist, Alexander J. Guttman, and others.

The indictment against the company officials returned as a result of more than ten months' investigation by the Post Office officials who charge that agents of the company sold hundreds of thousands of dollars worth of stock on fictitious holdings and on promises which, according to the government's case, "the said Birmingham Motors knew never would be complied with."

BUFFALO, Aug. 12—In a dispatch received here from Jamestown, N. Y., Samuel A. Carlson, mayor of that city, denied all knowledge of alleged fraudulent use of the mails by persons said to be interested in the Birmingham Motors Co., of which he is president.

"This company was organized to produce automobiles," he said. "It has a plant at Falconer which Mansfield of Detroit, our consulting engineer and a recognized authority on automotive construction, says is capable of producing 3,000 cars a year at a cost of approximately \$1,000 each."



Prize-winning float in the Chicago Ford Day Parade of the Pageant of Progress

Motorcycle Output Falls Off in Five-Year Period

Federal Census Figures Show 1919 Production Was 4.5 Per Cent Less Than That for 1914

WASHINGTON, Aug. 12—The motorcycle industry in the United States, numbering approximately 20 manufacturers, produced in 1919 59,214 machines having a total value of \$16,176,055, according to survey of the motorcycle industry, compiled by the Bureau of Census, as a part of the fourteenth census of manufacturers.

The survey, made at the behest of the tariff commission, includes bicycles as well, showing that during that year 470,676 bicycles were manufactured, having an aggregate value of \$12,277,341. During the year 1904 there were only 2300 motorcycles manufactured. Five years later, the next census showed that in 1909 a total of 18,628 were made, while the census of 1914 shows a total of 62,154 in number, valued at \$12,161,775.

A summary of the industry in 1919 shows that in the 20 establishments manufacturing motorcycles that 6411 people were employed, and that \$19,250,836 capital was invested. One of the outstanding features of the survey is that the stock in the 20 companies, the data shows, is owned by six proprietors and firm members. Compared with the previous years, the figures, in this connection, indicate that the manufacturing of motorcycles has been merged until at the present time only five or six companies control the motorcycle production in America.

In the five-year period from 1914 to 1919, the number of motorcycles manufactured decreased 2940, or 4.7 per cent, while the value of the machines increased \$4,014,280, or 33 per cent. The number of bicycles manufactured during the same period increased 171,646, or 57.4 per cent, and the value \$8,520,023, or 226.8 per cent.

Wisconsin led all other states in the number and value of motorcycles manufactured in 1919, with Massachusetts ranking second, while Ohio ranked first in the number and value of bicycles produced, and New York ranked second.

Dealer's License Revoked For Use of "Split" Plates

Boston, Aug. 14—Manufacturers and dealers who are planning driveways in case the rail strike continues had better confer with some of the motor vehicle departments of Eastern States, following the action of Massachusetts which has penalized a dealer by suspending his license for using "split" plates. As other New England States and adjacent ones are gradually agreeing upon general working agreements regarding motor laws what Massachusetts did may be followed by others.

The Roxbury Service Garage, which

Tire Statistics for First Half of 1922

NEW YORK, Aug. 11—Statistics of the rubber industry for the first six months of the year, compared with the same period in 1921, follow:

PNEUMATIC CASINGS			
	Inventory	Production	Shipments
1921			
January	5,319,605	703,430	965,417
February	5,193,918	819,892	1,073,756
March	5,597,103	1,163,314	1,614,651
April	4,527,445	1,651,418	1,785,951
May	4,451,668	2,100,917	2,085,882
June	4,154,456	2,313,265	2,643,850
1922			
January	4,174,000	2,055,000	1,597,000
February	4,691,000	2,084,000	1,562,000
March	5,183,286	2,645,790	2,073,963
April	5,464,336	2,401,187	2,086,651
May	5,523,095	2,721,503	2,639,273
June	5,042,147	2,838,890	3,133,260
INNER TUBES			
	Inventory	Production	Shipments
1921			
January	5,586,163	740,824	1,042,617
February	5,415,464	916,627	1,129,881
March	5,044,861	1,346,483	1,643,690
April	4,916,772	1,762,122	1,983,571
May	4,751,880	2,210,040	2,342,567
June	3,835,098	2,359,928	3,232,673
1922			
January	5,247,000	2,343,000	1,890,000
February	6,142,000	2,597,000	1,703,000
March	6,991,118	3,017,511	2,090,737
April	7,230,096	2,650,573	2,329,343
May	7,189,552	2,970,696	2,938,947
June	6,186,534	3,130,629	3,973,679
SOLID TIRES			
	Inventory	Production	Shipments
1921			
January	303,753	21,220	29,116
February	304,374	23,365	29,599
March	283,800	27,710	43,926
April	269,985	28,859	42,080
May	264,663	35,156	40,122
June	240,336	28,395	49,867
1922			
January	182,000	40,000	33,000
February	183,000	39,000	37,000
March	182,197	49,433	48,350
April	173,748	46,664	52,309
May	170,904	57,640	60,711
June	169,808	66,089	63,408

"Production" and "Shipments" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic work in factory and in transit to, or at warehouse, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

has a dealer license, was bringing over from New York six new cars. But it operates only under three or four dealer number plates. So three sets of plates were taken, and the real number plates issued by the State authorities were placed on the front of each vehicle. On the rear were cardboard plates. One of the Motor Registrar's deputies saw the cars coming through Hudson and stopped them. After making an investigation the facts were reported to Motor Vehicle Registrar Goodwin. His assistant went over the facts and then suspended the Roxbury Service Garage registration for 10 days, and also the licenses of the men driving the cars.

Under the law substitute plates are not allowed to be used except where one has been lost, and application made to the motor registrar for a new one. Pending its arrival a substitute may be used. Many owners and dealers never apply for a new one, but make their own substitute, so a crusade will be opened against this, and also against the split plates,

because it deprives the State of revenue for full sets.

"ASK 'EM TO BUY" AT DAYTON

DAYTON, O., Aug. 11—Two hundred and twenty-five dealers from Dayton and surrounding towns attended an "Ask 'Em to Buy" meeting Monday evening at the Gibbons Hotel. Following an address by Ray W. Sherman, merchandising director of the Automotive Equipment Assn., and the showing of the "Ask 'Em to Buy" film, many in the audience expressed their intention of establishing better automotive equipment departments.

The meeting was arranged by the Dayton Iron & Steel Co., G. W. Shroyer & Co., the local branch of the I. J. Cooper Rubber Co. and the Lewis Motor Mart Co., and was presided over by President Hinkley of the local trade association. C. B. Ozias, president of the Dayton Iron & Steel Co., told of the A. E. A. and its initiation of the "Ask 'Em to Buy" movement.

Price Reductions Stimulate Retail Sales in Milwaukee

Truck Business Improves as Rail and Coal Strikes Hamper Industry

MILWAUKEE, Aug. 14—The "shuffling of the cards" and the "new deal" in prices has undeniably been responsible for a very marked stimulation of consumer interest in passenger cars during the past week. As usual, a good many persons who did not gratify their desires to buy a new car in April, May or June, were perfectly willing to wait until after Aug. 1, the beginning of the new season, to see what the manufacturers would bring out for 1923, and what the price would be.

There is, of course, still some hesitancy on the part of buyers, since not all manufacturers have made their new season announcements. But many of the largest and most popular cars have their cards laid on the table, as it were, these being the cars that have come to be regarded as an index into the passenger vehicle industry. Dealers here feel that they can count on good, active business from now until cold weather, which usually comes early in November. Some look for a greater number of sales between Aug. 15 and Nov. 1 than from

March 15 to June 15. However, labor troubles now going on are leading them to proceed cautiously on all expenses and disbursements, and until these strikes are out of the way there will not be such free spending as characterized the second quarter's business this year.

Motor truck demand is increasing steadily. The call is largely for specialized equipment rather than the standard types. This includes passenger carrying trucks, freight trucks with special body designs, and contractors' and highway construction cars.

Retailers of automotive equipment are experiencing an active call for miscellaneous goods for old as well as new cars, despite the fact that more and more passenger car manufacturers are putting cars through with every foible of the customer satisfied.

BARLEY COMPANY HAS NEW CAR

DETROIT, Aug. 12—The Barley Motor Car Co. is preparing to bring out a medium priced car following the general lines of the Roamer, according to a statement by George Hopkins, secretary of the company, in an address before the Kalamazoo Exchange club. The car will not be called the Roamer, this name being reserved for the higher priced vehicle. Hopkins declined to give any details concerning the new car, though he declared plans and specifications have been completed.

Tractors Moving Fairly Well, Says Trade Review

National Assn. of Farm Equipment Manufacturers Issues Views

CHICAGO, Aug. 12—The monthly trade review issued by the National Assn. of Farm Equipment Manufacturers notes that up to July 15 tractors were moving fairly well and that the sale of general farm equipment, including gas engines, was at least equal in volume to the corresponding period of last year. Speaking of the business done by jobbers in the equipment lines, the review says:

"Generally speaking, it is reported from 50 to 75 per cent of normal, although a few of the firms whose goods they handle are doing a normal business. During July and August a slowing up of trade is not unexpected, due to the seasonal character of the goods sold, but jobbers anticipate that the period will show an improvement over last year unless the railroad and coal situations complicate matters unduly."

Sale of farm lighting plants is reported far ahead of last year, although still below normal. Production is said to be at a low point, shipments being made out of stock to a great extent. The eastern and central states are said to be showing a greater interest in lighting plants than is shown in any other part of the country.

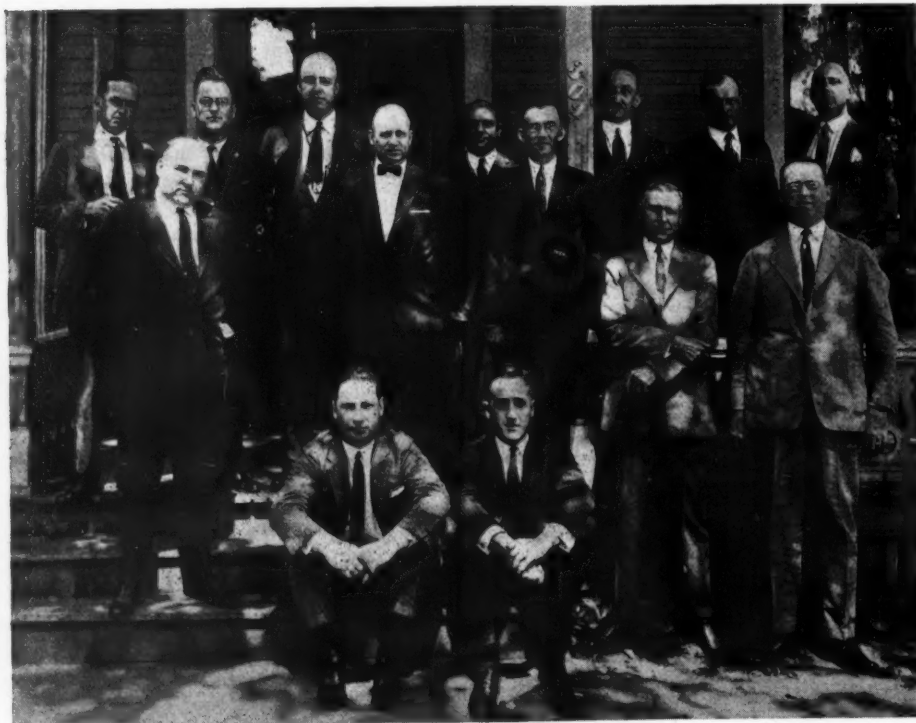
Conditions in the gas engine industry are said to be improving, with the betterment more noticeable in the industrial field than in farm engine lines. A majority of manufacturers reported tractor and thresher shipments ahead of those for last year. Production, the report says, has been increasing since the first of the year and would be greater were it not for the difficulty of securing labor. Tractor sales are said to have been well scattered throughout the agricultural states.

NEW ENGLAND OUTING

PROVIDENCE, R. I., Aug. 13—The annual outing of the New England Automotive Jobbers Club and the Boosters' Club, New England No. 1, held recently at the "Hummocks," near here, was attended by jobbers from Boston, Worcester, Portland, Springfield, Mass., Hartford, New Haven and Providence. The Boosters came from Chicago, Washington, Philadelphia, Cleveland, New York and Boston.

The membership of the Boosters' Club consists of manufacturers' representatives calling on the automotive trade in New England. Its members sign a pledge agreeing to endeavor to raise the level of the automotive industry by boosting the other fellow, fulfilling promises, being truthful, inspiring confidence, playing clean, being ethical, rendering service and not misrepresenting.

Dort Holds Sales Conference



FLINT, Mich., Aug. 14—District managers and sales representatives of the Dort Motor Car Co. held a conference with factory officials here a few days ago to discuss production and sales plans for the remainder of this year. It was decided to make a particularly vigorous

campaign on enclosed cars. Those in the photograph are: Top row, left to right, J. D. Fulton, E. G. Poxson, John D. Mansfield, F. C. Mattern, Paul Bunge, C. E. Boutelle, E. C. Boykin; second row, A. J. Shaw, J. B. Williams, S. C. Mitchell, H. M. Drake, E. W. Bogan; seated, W. J. Champ, W. M. Buck.

Gasoline Industry Hearing Starts; Lower Price Predicted

Secretary of American Petroleum Institute Is First Witness—Denies Combine of Refiners

WASHINGTON, Aug. 12—Seasonal consumption of gasoline and the advent of the internal combustion automobile engine are assigned as the reasons for the high price of gasoline by the American Petroleum Institute, whose books were placed before the senate manufacturing committee in the gasoline probe, which began on Monday of this week.

There is no restraint of trade and no combination among the oil refiners of America to keep up the price, was the declaration of R. L. Welch, secretary and spokesman for the institute. Efforts on the part of the committee members to establish that there was a gasoline combine were evidently anticipated by the institute, which cited several hundred pages of figures to prove that the independent companies are competitors and that the so-called Standard group constituted but 36.4 per cent of the total.

According to the figures submitted by the institute are 479 gasoline refinery plants in the United States. Of this number 38 belong to the so-called Standard group and the remaining 441 are independent.

In the United States, out of a total refining capacity of 2,109,700 barrels a day on Jan. 1, 1922, the independents controlled 1,342,600 barrels, or 63.6 per cent of the total production. Out of a total refining capacity in the United States and Mexico of 2,310,800 barrels per day, the independents in 1921 controlled 1,524,200 barrels, or 66 per cent, according to the figures placed before the committee. The total production of crude oil in the United States and Mexico last year was 659,000,000 barrels, of which the so-called Standard interests produced 20 per cent, the remaining 80 per cent being refined by the independents. The total production of oil in the United States in that year was 469,000,000 barrels, of which the Standard group interests produced 24.3 per cent.

Practically the whole of the first two days were consumed by members of the committee discussing the production and pro-rata sales of the two groups of oil refiners.

Touching on the profits made by the refiners, the declaration was made by the spokesman of the institute that from the fall of 1920 to the date of the senate resolution authorizing the probe, the refiners of the United States, taken as a whole, produced gasoline and other petroleum products at a loss.

Figures named in the hearing showed that the 10,000,000 automobilists in the United States last year used 123,000,000 barrels of gasoline—the refining product of 400,000,000 barrels of crude.

The refiners' net profit, including independent companies and the Standard Oil groups, according to figures of the institute, was less than half a cent a gallon for every gallon of gasoline handled.

"Despite the testimony which has been taken thus far tending to show that the refiners are losing money, while at the same time the automobile owner is being made to pay more and more for his gasoline, the committee is of the belief that the price of gasoline can be brought down substantially, and we intend to do so," declared Gilbert C. Roe, attorney, who is actively conducting the probe for the government. The hearings will continue for more than a month, it is indicated. Practically all of the officers of the 479 gasoline refineries in the United States have been invited to appear and give their version of gasoline prices.

Automobile Courtesy Campaign Started By Dealers

CHICAGO, Aug. 14—The Chicago Automobile Trade Association has inaugurated a campaign to promote "Automobile Courtesy." It has had windshield stickers printed bearing the words: "Automobile Courtesy—Chicago Automobile Trades Association." The word "courtesy" is in large, bold type, the others words being subordinated. The inscription is on a white field, surrounded by a green border decorated with white stars.

Members of the association are to be supplied with all of these stickers they can use and they are urged to paste one on the windshield of every car that drives up to the door or into the service station.

The reason for the campaign is stated in a letter sent to members by James Levy, secretary of the association, as follows:

"In the early days a motorist approaching a crossing would pause and let pedestrians cross—he did it with a smile. Today the average motorist assumes the attitude of 'to h— with the other fellow.' Another thing, courtesy among motorists themselves seems to be on the wane. It used to be the custom if one motorist saw another in trouble, he would stop and lend a helping hand. Not so today—a fellow in trouble might just as well be in the middle of a desert somewhere as on a busy thoroughfare, because every one drives by with head in the air."

The letter asks dealers to help center motorists' attention on the one idea—courtesy.

NEW WILLS STE. CLAIRE MODEL

DETROIT, Aug. 14—A Wills Sainte Claire brougham is now in production at the Marysville factory and deliveries are ready to go forward at once. The brougham is the first of this model that the company has made and is priced at \$3,375.

Drastic Regulation of Busses Proposed by Ohio Ordinance

Restrictive Measure Said to Have Been Drafted in Interest of Street Railway Company

NEWARK, O., Aug. 14—A new ordinance, drawn in the interest of the street railway company and licensing and restricting automobile busses, was introduced as an emergency measure in the city council. By the terms of the ordinance, bus owners would be required to submit a map of the route of the bus, the time of starting and stopping, and the ordinance provides that it would be unlawful to operate the bus on any streets other than on the proposed route shown by the map.

No license would be issued where the proposed bus route includes a street or streets over which the city interurban car lines operate, except where the bus route may cross such tracks.

License fees would be \$100 a year for cars of not more than seven passenger capacity, including the driver, and \$180 a year for busses of more than seven passenger capacity.

Indemnity bonds or liability insurance of \$10,000 would be required to be filed with the city auditor for busses of seven passenger capacity and the minimum for larger busses would be \$20,000.

Busses would be required to have a sign on the outside showing the points stopped at, and the rate of fare.

Bus drivers would not be allowed to solicit passengers by word of mouth nor to announce the time of starting nor tooting of horns or word of mouth.

Penalty of \$25 to \$500 fine for first offense, \$50 to \$500 for second, \$100 to \$500 for third and jail sentence of 10 days to six months for subsequent offenses would be provided for violations of the ordinance.

DUSENBERG TO ADD NEW LINE

INDIANAPOLIS, Aug. 10—The Duesenberg Automobile and Motor Co. of this city will break ground at once for the erection of an additional building 60x200 feet, which will be used as an fitting-up and finishing plant. The new building will adjoin the new factory structure of the company. The announcement was made by Chester Ricker, who was appointed general manager about a month ago. He also stated that Duesenberg will shortly add a line of Fleetwood bodies to be ready for fall deliveries. No price announcement as to the Fleetwood models is to be made at this time. It is definitely stated, however, that there will be no decrease in the price of Duesenbergs at this time.

The Fleetwood line will be offered in a variety of body styles. There will be five and seven passenger phaetons and roadsters in the open bodies, and a sedan, town brougham, and inside drive cabriolet in the Fleetwood line.

186,161 Motor Vehicle Sales Financed by G. M. A. C. Plan

Accommodations Extended by
General Motors Acceptance
Totals \$270,692,236

NEW YORK, Aug. 12.—The condensed balance sheet as of June 30 shows that for the first six months of the year 1922 the General Motors Acceptance Corp. has exceeded the volume in any corresponding period since the organization of this institution, which finances the wholesale and retail sales of such General Motors properties as Buick, Cadillac, Oakland, G. M. C. truck, Chevrolet and Oakland. A total business of \$68,251,586 for the half year is reported, a showing which, if continued, will make this the corporation's greatest year.

Total assets for the six months are \$49,405,658 of which \$6,075,150 is cash and \$41,667,151 secured receivables. Capital, surplus and undivided profits are \$5,132,635 and discounted obligations \$42,259,311. Reserves are \$598,725.

The report also shows that since the inception of the corporation early in 1919 to June 30, 1922 there have been financed under the G. M. A. C. retail plan a total of 186,161 cars, trucks and tractors and under the wholesale plan 126,920. This does not include other General Motors products financed nor the operation of the foreign department. The total amount of financial accommodation extended by General Motors Acceptance Corp. from inception to June 30, 1922, is \$270,692,236.

BIFLEX EXPANDS

CHICAGO, Aug. 15.—The Biflex Products Co., manufacturers of automobile bumpers, has increased the capacity of its plant at North Chicago 150 per cent by the purchase of buildings and land adjoining its property from the Chicago Hardware Foundry. The new property is well served by railroads and the ground now held by the Biflex company is large enough to provide for future expansion.

JUNE AUTOMOBILE EXPORTS

WASHINGTON, Aug. 13.—With a total production of 263,002 passenger cars and 25,962 trucks in June, the export figures compiled by the United States Department of Commerce, show that of the passenger production 3.09 per cent of the cars were sold abroad, and of the trucks were 4.31 per cent found foreign buyers.

STAR IN PRODUCTION

NEW YORK, Aug. 12.—At the meeting of 75 of the eastern distributors of the Star now in progress at the Biltmore here it was announced by President Carroll Downes that the Star now is in production at the Lansing and Long Island plants and that production will start in the California plant in two weeks.

The distributors also were told of the awarding of a \$1,000,000 contract for the construction of new buildings at Leaside, Canada, which will be used for Star construction. The new plant will have a floor space of 500,000 square feet. This Canadian plant is to turn out 18,000 for 1923, 10,000 of which will be for domestic trade and 3,000 for export. This plant is to be completed Dec. 1.

White Co. Has 5917 Fleet Owners on List

CLEVELAND, Aug. 12.—Statistics gathered by the White Co., covering the 13 years it has been manufacturing gasoline trucks, show that there are 5917 fleet owners using 51,811 commercial vehicles made by White and representing a value of more than \$180,000,000. Fifteen owners have invested more than \$20,000,000.

Going into the statistics one finds that the first of the year 506 owners were operating 18,527 White trucks in fleets of ten or more, whereas 12 years ago these same owners had only 60 trucks on the road. A shining example is W. & J. Sloane, the New York furniture and carpet house, which was operating 13 Whites in 1910 and now has 31.

The owner of the largest fleet is the Gulf Refining Co., with 1,177 trucks representing an investment of more than \$3,000,000, starting with one in 1911. Other large fleet owners include the Associated Bell Telephone Companies with 806; Standard Oil Co. of New York, 649; Union Oil Co., of California, 534 and the United States Post Office Department, 665. In addition there are 5,411 owners operating fleets of fewer than 10, totaling 33,284 trucks.

BUICK SPECIAL DELIVERY TRUCKS

FLINT, Mich., Aug. 10.—The prices on the four-cylinder, special delivery Buick truck are based on a chassis price of \$725. The body prices vary with the type and are as follows:

Open express body with cab, \$840; Panel body with cab, \$860; Canopy top with roll curtains and cab, \$855; Canopy top with screen sides, roll curtains and cab, \$875; De Luxe panel body with cab, \$960; Combination passenger and express body with cab, \$935.

OUTING FOR ATLANTA DEALERS

ATLANTA, Ga., Aug. 10.—Practically the entire membership of the Atlanta Automobile Association, an organization of dealers and equipment merchants, attended the annual outing and frolic the organization held Aug. 2 at the Brookhaven Country Club here. A golf tournament featured the event.

GASOLINE DOWN TWO CENTS

NEW YORK, Aug. 10.—The Standard Oil Co. of New Jersey announces a reduction of two cents in the price of gasoline for all of its territory. A similar cut in price throughout Pennsylvania and Delaware was made by the Atlantic Refining Co. The retail price of gasoline is now 27 cents and to garages 24 cents.

Most of Trucks Reimported From Europe Have Been Sold

Number Available for Shipment
Here Much Less Than Was
First Estimated

NEW YORK, Aug. 11.—Disposal of American trucks reimported from the former war zones by the Slough Trading Corp. of America is proceeding rapidly and, according to officials of the company, only about 300 vehicles are yet to be sold at wholesale. It is also stated that reports indicate that dealers in various parts of the country who have bought the trucks for resale have been successful in disposing of the greater number of them.

Up to date the Slough company has brought into the country only about 1200 trucks and about 200 others were brought here in small lots by other importers.

Information given the American company by the Slough Trading Corp. of England is that nearly all of the trucks available for reshipment to the United States have been sent here and that the process of putting these vehicles on the American market is practically completed. It was at first expected that a much larger number of trucks would be brought here, but a good many have been sold in Europe and recent attempts of the Slough Trading Corp. of America to get additional shipments started on the way here have been met with the information that there are no vehicles to be had.

Virtually all the trucks brought here are heavy duty vehicles, including Mack, Packard, Pierce-Arrow, White and a few other makes.

BUSSES WIN IN GEORGIA

ATLANTA, Ga., Aug. 12.—The Georgia Motor Bus and Transportation Association has won a substantial victory in its effort to defeat a bill before the present session of the Georgia state legislature, and formulated by the short line railroads, by the terms of which the motor bus was to be made a common carrier under the jurisdiction of the state railroad commission. The senate committee on railroads, after a hearing on the bill, reported unfavorably regarding it and named a sub-committee to further investigate and to draw a substitute bill. The latter will be considerably less stringent than the one offered by the railroads, if such a bill is passed at all, of which there is now considerable doubt. The bus industry feels that it has won a complete victory in the fight.

THOMART REDUCES CAPITAL

AKRON, O., Aug. 13.—Stockholders of the Thomart Motor Co. of Akron and Kent today approved the company plan of reducing its capitalization by decreasing its preferred stock from \$5,000,000 to \$2,000,000 and its no par common from 100,000 to 70,000 shares.

National Conference On Highway Education Planned

Engineering and Highway Transport Leaders to Meet in Washington Oct. 26, 27 and 28

WASHINGTON, Aug. 14—Plans for a second national conference for the study of highway engineering and highway transport education are being prepared by the Highway Education Board, Dr. John J. Tigert, chairman, according to announcement here.

Leading figures in the teaching of highway engineering and highway transport, officials in charge of highway construction programs, members of the automotive industry and kindred fields, together with representatives from other countries are being invited to attend.

The conference will be held in Washington Oct. 26 to 28, inclusive, and, according to the tentative program, this period will be devoted to the intensive study of highway and engineering problems.

According to a statement of the program committee, the object of the conference is "to review the field of highway engineering and highway transport education in the light of expanding state and federal highway programs and the rapidly increasing social and commercial use of the highways; to discuss general and special courses in undergraduate and graduate curricula; and to exchange views on educational trends arising from these developments in the national transportation system."

Tentatively, the committees will be assigned to the study of the following problems:

- 1, Undergraduate and elective courses in highway engineering; 2, undergraduate and elective courses in highway transport; 3, graduate work in highway engineering and highway transport; 4, short course in highway engineering and highway transport; 5, introductory general course in highway engineering and highway transport; 6, vocational training for non-professional highway personnel, and, 7, highway traffic regulation and safety.

Invitations to the conference are being issued by the chairman. Information with regard to the conference may be had upon request to the Highway Education Board, Willard building, Washington, D. C.

South Africa Dealers Find Used Cars a Problem

JOHANNESBURG, July 4—(By mail.)—Dealers throughout South Africa are finding the used car problem difficult to solve. A number of dealers have stocks on hand taken in at very high prices, and they are now proceeding to take their losses. In many instances these used cars have been sold at auc-

tion. Often the auctioned cars bring low prices and sometimes are bought in by other dealers who recondition them and get fair prices.

Up to the present the used car business has been poorly handled, as few dealers have taken the trouble to really sell the cars. It is good to be able to report, therefore, that several large firms in Johannesburg, and elsewhere in the Union, have decided to sell used cars properly. The General Garage, Dodge agents for the Transvaal and Orange Free State, have started a department for reconditioning Dodge Brothers cars. These are thoroughly overhauled, and are sold with the company's backing. The cars are kept in a good salesroom.

Some dealers are refusing to take in used cars at all, but it is certain that they are losing sales of new cars through this. They feel that the used car market is too unsteady to allow of holding any in stock. Others are offering fair prices—prices that are too high in the opinion of many.

OHMER INSPECTS NATIONAL PLANT

INDIANAPOLIS, Aug. 9—Will I. Ohmer, chairman of the board of directors, and Louis Ruthenburg, president of the Associated Motor Industries, yesterday visited the plant of the National Motor Car and Vehicle Corp. in this city, which was recently taken over by the merger. Together with Geo. Dickson, president of the National and vice-president of Associated Motor Industries, the officials made a thorough inspection of the National plant and expressed themselves as exceedingly well pleased with its facilities.

SAXON REVISION CONSIDERED

DETROIT, Aug. 12—The Saxon Motor Car Co., following the authorization by its stockholders of a new issue of preferred stock which will give the company \$750,000 in additional working capital, is working out plans for revisions in its product which if followed through will result in the changing of the line into a six cylinder line which will market at about the same selling price as the present four cylinder.

GOODYEAR REORGANIZATION ATTACKED

AKRON, Aug. 9—Four suits attacking the legality of the \$85,000,000 refinancing and reorganization program of the Goodyear Tire & Rubber Co., under which Frank Seiberling, founder of the company, was deposed as president and succeeded by E. C. Wilmer in May, 1920, demanding an immediate surrender of 275,000 shares of common stock alleged to be illegally held by underwriters of the Goodyear \$27,500,000 issue of debenture bonds and claiming the contract under which Wilmer is serving as president, illegal, were filed in the Summit County Common Pleas court here by Laura L. T. Weiss of Cleveland on behalf of herself and all other Goodyear stockholders.

Dealers of Central Illinois Find Loans Easier to Make

Coal Strike Not Affecting Central Part of State or Sales

BLOOMINGTON, Ill., Aug. 12—Motor car dealers of central Illinois are advised that the financial situation is easier and loans not so difficult to obtain from banks as was the case last spring. Bankers, as a rule, are showing greater respect for the men engaged in the motor car industry, and there is much more consideration shown than during the preceding year. They confess their amazement over the figures of the Illinois Secretary of State which show that up to Aug. 1, 715,000 motor vehicles were registered against 670,452 for the entire year of 1921 and 612,566 for the first seven months. This year is showing an increase of 100,000 vehicles over last year.

Central Illinois car dealers have had difficulty in securing cars to fill their orders and, therefore, have not been seeking loans, their own resources being sufficient to take care of their business when the cars are snapped up as rapidly as they can be delivered. A few of the dealers here are handling time payment sales. Others are developing finance corporation connections. Occasionally, a dealer is able to slip notes into the home town bank for collection from car buyers. Some farmers are being considered prospects for cars this season who had never been listed before. These men have enjoyed good oats and wheat crops and are now counting upon a bumper yield of corn.

The coal strike is not affecting central Illinois as the bulk of the mines are at Springfield and points south. North of Springfield, the miners' controversy has not been noticed.

It now looks as if the farmers were going to have the money during the coming fall and the central Illinois dealers are going to pay more attention to the rural prospects than they did last year. Grain and live stock prices are ruling strong and the prospects for heavy yields of corn continue good.

STEWART-WARNER'S EARNINGS

CHICAGO, Aug. 11—The largest earnings in any quarter were reported by the Stewart-Warner Speedometer Corp. for the three months ending June 30. The quarter's earnings were \$1,605,267 amounting, before Federal taxes, to \$3.38 a share. This was more than annual dividend at the present rate of \$3. Earnings for the first six months of the year were \$4.65 a share, as compared with \$1.37 for the first six months of last year.

Officials of the company state that business is continuing good and that there are no indications of any material falling off.

Speedy Tire Changer Does Some Fast Work at Picnic

**Charles W. Paine of Philadelphia
Wins Cup for Speedy Bare
Hand Work**

PHILADELPHIA, Aug. 13—Charles W. Paine, of this city, who claims the championship as the fastest tire changer in America, in lightning tire-changing feats was one of the main attractions at the first annual outing of the Automotive Service Assn. at Betzwood Farms Inn, Betzwood, Pa. The association, with the Automobile Accessories Business Assn., whose board of directors were guests at the outing, presented to Paine, at the conclusion of his contest against time, a handsomely engraved silver loving cup, which will be held by him until he has been beaten in a championship contest, open to all comers. Defeating all his challengers three times will entitle the winner permanently to the trophy.

There was also awarded to Paine for his work today, a medal offered by Tires, of New York. Garfield List, well known tire man of this city, also has offered a medal for the fast-changing tire championship of the metropolitan district of Philadelphia. National interest has now been awakened in Paine's claims. Paine is tire-changer for the local distributors of United States Tires, 329 North Broad street.

Paine's feats, conditions of contest, as well as time, in his work against time, were as follows:

No. 1—Jacking car up; removing cap and air from 30x3½ Goodyear All-Weather Tread clincher with bare hands, no tools; inserting new tube in new Goodyear All-Weather fabric and applying to wheel with bare hands, no tools; pumping 65 pounds of air, attaching cap and removing jack. Time, 3 minutes 28½ seconds. One trial allowed.

No. 2—Applying Goodyear All-Weather tread to wheel, valve stem to be through hole of wheel, beads not being seated. Time, 3 2/5 seconds. Three trials, if desired.

No. 3—Mounting 37x5 tire on 36x4½ Stanweld split rim, and removing. Time, 57 seconds in locking and 34 seconds in unlocking, or 1 minute 31 seconds in all.

No. 4—Mounting 35x5 tire on 34x4½ Firestone one-piece rim, with straight bead fillers, and removing. Time, 1 minute 55 3/5 seconds.

No. 5—Mounting 35x5 tire on 34x4½ Firestone split rim, applying compressed air to 70 lbs., any compressed air desired to be used in contest, with following tools permitted for world's championship: One single-barrel air pump, one screw driver of any size, one hammer of any kind, one chisel of any size, two perforated handle pry bars, one pair of pliers, one air gage to correspond with air gage held by judges, one rim tool of any make or size and one spring leaf of any size, style or weight. Paine's time, one minute flat.

No. 6—Taking any wheel on a Cadillac 1921 or 1922 model, 35x5 or 33x4, using United States cord tire; jack car up, removing air and changing tire; inserting another tube, applying it to rim and car, in any manner so that the change is made, and removing jack. Paine's time, 3 minutes. Two trials allowed.

Paine's rim work was done on a springy wooden platform, preventing him from making his best time. He has frequently beaten in practice some of the figures made today.

Official timekeepers at the contest were C. C. Bulkeley, executive secretary of the Philadelphia Automobile Trade Association and secretary of the Automotive Service Assn.; James B. Dickson, president of the Automotive Service Assn. and superintendent of service of the Neel-Cadillac Co.; W. H. Metcalf, president of the Automobile Accessories Business Assn., and Jerome T. Shaw, editor of Tires, New York, who was also referee.

Other events were athletic contests.

Thirty-five automobiles, preceded by a band of 35 pieces, started from Broad and Callowhill streets at 1:30 p. m., to convey the members and guests, numbering 100, to Betzwood. A good dinner was served on the piazza of Betzwood Inn and on the lawn under the trees, while the band played.

The entertainment committee consisted of J. J. Heinle, C. C. Bulkeley, Capt. D. Risley and Messrs. Marshall, Daniels and Hoffman.

Smaller Cars for 1923 French Grand Prix Races

PARIS, Aug. 10—A piston displacement of 122 cubic inches, with a minimum weight of 1,433 pounds, will be the conditions of the 1923 French Grand Prix race, according to a decision by the racing board of the national club. In addition to this race there will be a repetition of the fuel consumption race, with a lower minimum chassis weight and a smaller allowance of gasoline. It is not known where the races will be held, but Strasbourg and Tours have already made proposals.

FOR THE DRIVER'S CONVENIENCE

PRINCETON, Ill., Aug. 12—Business men of this city have pledged \$2,000 and asked the city to give an equal sum for purchase of a four-acre tract in the business section of the city. It is proposed to establish a free parking area there and solve the traffic congestion and problems which have faced the village.

DORT PLANT IN CANADA

WINDSOR, Ont., Aug. 11—Following the announcement that Dodge Bros. had purchased a site for the erection of a large plant in Windsor, comes the announcement by Robt. Gray, that the Gray-Dort Motors, Limited, will, in the immediate future, erect a large plant in Windsor.

OLD RELIABLE TRUCK REDUCED

CHICAGO, Aug. 10—The Old Reliable Motor Truck Co., has reduced the price of its model D 5-ton truck from \$5,250 to \$5,000.

August Tire Production May Pass July and Set New Record

**Downward Trend of Prices May Be
Accountable for Big
Demand**

AKRON, O., Aug. 11—With July the biggest month from a standpoint of production in the entire history of the tire industry in the Akron district, everything so far this month indicates that the August production will exceed that of July and will establish a new record.

Tire production in the Akron district for July exceeded 2,750,000 tires. This is a bigger production than registered for any month during the hectic and shortlived era of unprecedented boom during the fore part of 1920.

The July record is unusual in view of the fact that according to all records of the tire industry and all the laws of fluctuating tire demand as based upon the weather, July ordinarily is one of the slowest tire months of the year and a month when manufacturers have been accustomed to rest on their oars until the seasonal slump in buying is over. Many manufacturers anticipated this seasonal slump last month but it failed to materialize and they found themselves with inadequate forces to supply enough tires to meet the ever increasing demand.

And as August is usually a heavier month than July, this month's record probably will reach the 3,000,000 mark at the present rate of tire production of nearly 110,000 tires a day in the Akron district alone. Figures show that a dozen companies last month produced tires at the rate of 33,000,000 tires a year or enough to supply the entire needs of the United States.

The downward trend of tire prices may be held accountable for a large portion of the heavy sales demand for tires. The increase in the number of machines in use naturally has increased the demand for tires also.

INDUSTRY GAINS IN TOLEDO

TOLEDO, Aug. 10—Despite the brake put upon industry by rail and coal strikes, employment in the automotive industries at Toledo held its own in most of the large plants and made slight gains in smaller shops in July.

The gain for the industry was nearly 200 employes as compared with June 30.

Electric Auto-Lite Co. put on 97 more employes; Milburn Wagon Co. added 71 men; Bock Bearing Co. made a slight gain, while Willys-Overland, Toledo Chevrolet and Champion Spark Plug Co. held steady.

Toledo Machine & Tool Co. and Doehler Die Castings Co. made gains in employment.

Textiles showed a gain in numbers at work.

The total number of workers in automotive plants here is more than 17,000 at the end of July.

BUSINESS NOTES

Toledo Spring Service Co., Toledo, Ohio, has been incorporated with a capital of \$100,000 to manufacture, repair and deal in springs for automobiles and trucks. The place of business is at 2-4 St. Clair street. Incorporators are Henry J. Herman, Earl H. Hunter, Robert Hunter, Scott Stahl and Jeanette MacDougal.

Ames Built Sales Co., Cleveland, Ohio, has been chartered with a capital of \$25,000 to deal in automobiles and accessories and to operate a service station. Incorporators are S. H. Humphrey, Margaret A. Humphrey, J. P. Reed, J. H. Humphrey and Lois Low.

Torgler Motor Sales Co., capitalized at \$50,000, has been organized to handle Stearns-Knight, Elcar and International trucks in Toledo territory. Carl V. Torgler, well-known among Toledo dealers, heads the new firm. Salesrooms are at 14-11-15 Jefferson avenue.

Mason Tire & Rubber Co., Kent, Ohio, has installed a new branch office and warehouse in Pittsburgh, at 6305 Penn avenue, with R. W. Mason as manager and Harry P. Hahn, cashier. The territory assigned the new branch consists of practically the western half of Pennsylvania and the northern half of West Virginia.

Arthur P. Hawes, late of the H. C. S. car organization here, has joined the W. E. W. Motor Corp., Philadelphia, distributor of Durant cars, in the capacity of salesmanager. Prior to joining the Stutz concern Hawes was general manager of the Locomobile Company of America, having charge of the Philadelphia, Baltimore and Washington territory.

Stanley E. Stady has been appointed sales promotion and advertising manager for Harper & Harper, 304 North Broad street, Philadelphia, in connection with the Hupmobile agency. Stady formerly was in charge of the advertising of the International Harvester Co., for the eastern district. He was an instructor in advertising and salesmanship at Temple University.

A factory distributing branch for the southeastern territory is to be immediately established in Atlanta by the Templar Motor Co., of Cleveland. The branch will handle southeastern Templar sales, including cars and parts, and also maintain a large service station.

L. L. Parish has taken control of the Central garage at 400 Sixth street S., Minneapolis, one of the largest in the Northwest. He will restore a service system he abandoned a year ago when he gave up the garage.

Enos Ashley, head of the Ashley Motor Co., Franklin distributor at 1301 Nicollet avenue, Minneapolis, has taken over the Town and Country Motor Co. establishment at 212 Tenth street S., where he will have Earl sales and service and a general garage and service business. Samuel Nelson, many years with the Ashley Co. as manager of the service department, is to manage sales and service at the Town and Country, as a member of the company.

SALES INCREASE IN SOUTHWEST

ATLANTA, Ga., Aug. 12—One of the most encouraging features the automotive industry has noted in the southeastern territory in the past two years is the steady increase dealers report from all sections in the sale of passenger cars, trucks and tractors to farmers during the past few weeks, this business now having attained a volume even better than the average of pre-war times. The buying power of the southeastern farmer has been steadily increasing for months and with excellent cotton prices now prevailing for this year's crop, and other farm prices at levels that insure the agricultural industry of the section a satisfactory profit for the first time in three years, farmers have entered the market again apparently with a desire to make up for lost time.

Farm implement and tractor sales are

Horace E. Rice, assistant to the president of the American Bosch Magneto Corp., Springfield, Mass., was killed Aug. 4 when his automobile was wrecked by a Pennsylvania railroad train at a grade crossing in Oxford, Pa.

Burlington Battery and Electric Co., Burlington, Iowa, has been established as a branch of the Friday Battery and Electric Corporation of Ottumwa and Sigourney. Twenty-seven systems are handled by these distributors in both wholesale and retail field.

Starkweather-Snook Corp., 167 First street, Moline, Ill., will erect a \$25,000 plant addition this fall, according to E. R. Snook, general manager. Shock absorbers and other accessories are manufactured and business has increased so rapidly that new quarters are necessary to handle the volume of orders. Dr. G. A. Starkweather, Fort Madison, Iowa, is president.

Oak Hill Rubber Co., Oak Hill, Ohio, has been chartered with a capital of \$175,000 to manufacture tires and tubes and other rubber articles. Incorporators are W. A. Byrider, G. W. Alden, J. F. Smith, O. M. Roderick and Beulah Hartman.

Lima Buick Co., Lima, Ohio, has been chartered with a capital of \$25,000 to deal in automobiles and accessories. Incorporators are L. B. Merritt, R. P. Mackenzie, Leefe Claybaugh, L. H. Merritt and H. A. Holdbridge.

Howe Motor Co., Columbus, Ohio, agent for the Ford, has just completed a large addition to its salesrooms and service station at 1158 West Broad street, which makes it one of the most modern plants in the city. The salesroom is 70 by 30 and finished with tile floor. The service department is 40 by 70 on the first floor and the entire second floor 70 by 115 feet. In addition the offices and stock rooms are on the first floor.

Lawwell-McLeish Co., Columbus, Ohio, dealers in Fords, has acquired adjoining ground to its present salesrooms and service station on North Fourth street, which will be used to enlarge the building. The new ground will give the company a frontage of 93 feet on Fourth street and a depth of 187½ feet. For the present a new two-story building is to be erected on the property.

Paul M. Farmer, who was formerly connected with the Klaxon Co., has organized the Farco Mfg. Co., Suite 339, 30 Church street, New York, N. Y. They are producing and will market through the trade channels a line of automotive accessories. Their first item is the Farco Foot Accelerator for Fords in which is incorporated a number of new and unusual features. Other items are to be announced shortly.

Board of Directors of the Grand Rapids Tire & Rubber Corp., at a meeting held last week, authorized the construction of an addition to the Corduroy Cord factory in the shape of a complete new unit. Work on the new addition will start at once and when completed will cost in the neighborhood of \$250,000.

among the automotive lines that have been steadily picking up of late and distributors of this section are anticipating a business during next spring that will be the best since the era of prosperity immediately following the war.

TO MAKE STAR IN CANADA

TORONTO, Can., Aug. 11—A contract has been awarded by the Durant Motors of Canada, Limited, for the construction of new buildings at Leaside, to cost approximately \$1,000,000. Work has already started and the contract calls for completion by December 1.

The new plant will have floor space of 500,000 square feet and will be used exclusively for the manufacture of the Star car. Production for 1923 calls for 18,000 cars, 10,000 for domestic trade and 8,000 for export.

Chandler Explains Reductions As Reversal of Economics

Big Buying Spurt Is Responsible for Price Cuts He Says

CLEVELAND, O., Aug. 10—"A most amazing reversal of generally accepted economics explains the recent mid-summer reductions of automobile prices," says Fred C. Chandler, president of the Chandler Motor Car Co.

"Generally speaking, what has come to be known as a buying strike on part of the public is usually responsible for bringing down prices.

"This was the explanation of the great deflation movement between midsummer of 1920 and the beginning of 1922.

"The public declined to pay the prevailing high prices and withdrew from the market. Then prices came down.

"Exactly the opposite explains the present new low level of automobile prices. This reduction was brought about through big buying.

"The public has bought in such quantities that unexpected economies were made possible. As a result, we have the present new range.

"No manufacturer foresaw such a development at the beginning of 1922, when new prices were set. All of them went as low as seemed possible, based on the volume of business in sight. Among manufacturers there was a general opinion that these prices would stand for the whole year.

"Then came a rush of business based first on the necessity of the automobile in relation to the every day life of the typical American family, and second, on improving business which brought into the market many buyers who had been waiting two years. This changed the whole situation and warranted new prices.

"The genius of the American automobile industry has been in the ability to reduce prices by quantity production.

"Manufacturers have not hesitated to cut their profit to get volume, and thus to share with the public the benefits of expanding business.

HARLEY-DAVIDSON CUT

NEW YORK, Aug. 12—Harley-Davidson Motor Co. has announced a price cut on its 1923 models. Prices are as follows:

Model—	Old Price	New Price
23-F	\$ 335	\$ 285
23-J	365	305
23-FD	360	310
23-JD	390	330

U. S. TIRES LOWER

NEW YORK, Aug. 13—United States Tire Co. has announced price reductions meeting the cuts previously made by the B. F. Goodrich Co. Prices have been lowered 10 per cent on cords and 15 per cent on fabrics with the exception of Ford sizes which remain unchanged.

CONCERNING MEN YOU KNOW

F. M. Gibbs has joined the Philadelphia branch of Martin-Parry after spending several years in the factory. Recently he has been in charge of territorial sales in the York region.

Walter P. Coghlan, recently general sales manager of the American Hammered Piston Ring Co., Baltimore, has been appointed vice-president and director of sales of the Trexler Co., Philadelphia. Mr. Coghlan will direct the sales of the Trex air valve lock, which was placed on the market last spring.

Rolf C. Spinning has resigned as advertising manager of the Service Motor Truck Co., Wabash, Ind., to become manager of the Detroit office of the Service Corp., Troy, N. Y., which specializes on automotive development, maintaining offices in Troy, Detroit and New York City.

George M. Gillette, president of the Minneapolis Steel and Machinery Co., maker of the Twin City tractor, has resigned, but remains member of the executive committee and of the directorate. His successor has not been named. Gillette said that after 40 years' hard work he would take a rest. For 20 years he has been an officer in the company. Twelve years previous to his going with the Minneapolis he was secretary and treasurer of the Gillette-Herzog Co., succeeded by the American Bridge Co.

C. H. Wills & Co. is contemplating an addition to its present plant at Marysville, Mich., to afford 104,000 sq. ft. more of floor space, in order to provide greater facilities for painting and trimming. At present the company is doing all its own painting of roadsters and phaetons. The Illinois Tool Co. plant, purchased by the Wills company, is now being equipped with \$250,000 worth of machinery. This plant will augment its working force by 400 men.

B. F. Powers Motor Co., Inc., selling the Gardner car in the Northwest, has sold a fleet of machines to the White Bear Auto Transit Co., successor to Fuller's Auto Line, operating touring car bus service from St. Paul to lake points and Minneapolis.

E. H. Gilchrist, general sales manager for the Westcott Motor Car Co., of Springfield, Ohio, is making a trip through the east visiting district managers and distributors in New York, Boston and other points.

C. H. Spencer, formerly with the Gilbert & Barker Mfg. Co., has become a member of the Clark & Breck Co., Winton and Velie distributors, Springfield, Mass. R. G. Breck and Harry W. Stacy have retired from the concern. The maintenance department has been put under the charge of Charles Pettis.

W. R. Dunn has been put in charge of retail sales of the Mitchell car by the McNulty Dafee Co., which has taken distribution of the Mitchell at 1526 Hennepin avenue, Minneapolis. He has been 15 years in the mechanical end of the automobile business.

R. B. Tracy, in charge of general sales, has resigned his position with the Globe Rubber Tire Co., Trenton, N. J. Previous to this connection Tracy was one of the factory representatives for Michelin, being identified with that company for 16 years.

William Horner, a pioneer in the automotive industry here, who was with the Locomobile Co. of America in the early days and later with the Westinghouse Co., has opened an automobile accessory shop at 2004 Sansom street, Philadelphia, Pa.

Justin Hammond, for a number of years a California automobile dealer, has opened a store at Broadway and Fourteenth streets, San Diego, to handle Haynes cars.

James O. Harris, formerly a sales representative for the Cadillac Motor Car Co., and Ralph A. Parker, formerly manager of the Toledo Cadillac Co., have formed the Cadillac Co. at Atlanta, Ga. Coincident with Parker's entry into the Southland, Eugene Dautell, of the Toledo organization, has been selected as general manager of the Toledo Cadillac Co.

Maurice Switzer, vice-president of the Kelly-Springfield Tire Co., has been added to the executive committee of the advertising managers council of the Motor and Accessory Manufac-

turers Assn. He has consented to speak at the Buffalo convention of the association in September on the "Anomalous Position of the Average Advertising Man."

Thomas B. Blakiston, who was formerly assistant general sales manager, has been appointed general sales manager of the American Hammered Piston Ring Co. of Baltimore.

Campbell Wood, who formerly represented the wholesale division of the Klaxon Company in the states of Missouri, Kansas, Oklahoma, Texas, Colorado and New Mexico, has become a sales representative of the motor equipment division of that company with headquarters at Detroit.

T. B. McBride, recently connected with the Peden Iron & Steel Co., at Fort Worth, Texas, succeeds Wood. E. V. Scotford, formerly of the advertising and sales promotion department of the United States Tire Co., is now acting advertising and sales promotion manager of the Klaxon Company.

O. R. Randall, connected for some time in an executive capacity with the Hanson Motor Co., of Atlanta, has resigned to become general sales manager for a large soft drink bottling company in Atlanta.

Cecil L. Rood, for six years county engineer at Toledo, has been elected general manager of the Wills-Sainte Claire Co., of Toledo, to succeed Edward C. Gernhardt. Rood is one of the four owners of the company.

A. L. McCormick, manager of the Paige Sales & Service Co., has been elected treasurer of the Detroit Automobile Dealers' Assn., succeeding Charles W. Hathaway and H. W. Peters, manager of the Detroit Packard branch, has been named a director succeeding C. A. Triphagen. Hathaway was formerly manager of the Detroit Lincoln branch which was closed under the new Lincoln sales plan, and he has become connected with the Cleveland Cadillac organization. Triphagen was formerly manager of the Detroit branch of Reo Motor Car Co., having been called to the Reo factory to become one of the sales executives there.

L. R. Wright, district manager for the southeastern states for the Samson Tractor Co., and located at Atlanta, Ga., has resigned. His future plans have not been announced.

Thomas J. Ferguson, connected with the Dean J. Deakne Co., has taken over the Wilmington, Del., agency for the Chandler and Cleveland lines. He has opened a large and attractive sales and show room at 1017-19 Tatnall street.

A. D. Holabird, for fourteen years an automobile distributor and garage proprietor at Decatur, Ill., has disposed of his interests to D. N. Hansen and the latter took charge of the plant on East Wood street Aug. 1. Holabird was the first motor car agent in Decatur and has kept steadily at the business since. He has been distributor of the Maxwell car.

Haynes Automobile Co. announces the appointment of Charles W. Tway, of Atlanta, Haynes distributor in 12 southern states for some years, as southern district sales manager for this same territory, headquarters in Atlanta.

Benjamin F. Ulmer, Atlanta, Ga., one of the best known automobile men in the southern territory, and well known to the trade nationally as an author of several important works on automotive salesmanship, has been named manager of the Atlanta branch of the Buick Motor Co., succeeding Byron H. King, who has been promoted to district sales manager with headquarters in Atlanta. Ulmer has been assistant manager under King, and has been in the automobile business continuously for fifteen years, starting with the Buick ten years ago. In that time he has advanced from utility salesman to manager. He is now secretary of the Atlanta Automobile Association, and serving his third term as director of publicity for the Atlanta Automobile Show.

Fred Rawlings, formerly with the Cadillac Co. and well known in the automotive industry in the district, will establish a manufacturers' agency in Shanghai, China, early in 1923, handling business in China and parts of Asia, specializing in automobiles and tractors.

even in July. These sales were widely distributed, too, as a result of the company's new sales plan, which has resulted in the establishment of representatives in the principal cities.

Program of M. A. M. A. Round Robin Discussion Completed

Many Problems of Interest to Automotive Men Will Be Discussed

NEW YORK, Aug. 12—The program for the round robin discussion at the meeting of the Motor and Accessory Manufacturers' Assn. at Buffalo Sept. 13-14, which will be participated in by automotive advertising managers has been completed. E. W. Clark, advertising manager of the Clark Equipment Co. and chairman of the council, will preside.

Maurice Switzer, vice-president of the Kelly-Springfield Tire Co., will present a paper for discussion on the status, responsibility and executive authority of the advertising manager in relation to other officials in the company, and the discussion will be led by Joseph S. Jacobs, advertising manager of the American Hammered Piston Ring Co.

J. C. McQuiston, manager of the department of publicity of the Westinghouse Electric & Manufacturing Co., will speak on the greater standardization of printed matter as a means of reducing advertising costs.

Publicity problems affecting both trade papers and general press will be discussed by James Dalton, editor of Automotive Industries, and Walter Birmingham, automobile editor of the Chicago Evening Post.

Edward S. Jordan, president of the Jordan Motor Car Co., will speak on behalf of the advertising executives of the National Automobile Chamber of Commerce.

"Charting the Future Markets of the Automotive Industries" will be the theme of two papers to be presented by Harry Tipper, business manager of the Class Journal Co., and C. A. Musselman, treasurer and general manager of the Chilton Co.

DODGE TO HAVE CANADIAN PLANT

DETROIT, Aug. 14—Plans for the erection of a Dodge factory in Windsor have not yet reached a point where the company will make an announcement of its plans or the extent to which it will go in a Canadian investment, but it is definitely determined that the company will build soon. The property obtained is at the west end of Windsor, an option having been taken on it about a year ago. The former owner was M. G. Campbell, manager of the Windsor branch of the Kelsey Wheel Co.

The system of incorporating certain Canadian made parts into the Dodge cars exported into that country will be continued for the present, the lease the company holds on the Canadian Pacific deck remaining, though subject to cancellation. The new factory will provide for an all Canadian built car, it is understood, and will not be assembled from parts made in the Detroit plant.

ROLLS-ROYCE INCREASE

SPRINGFIELD, Mass., Aug. 10—Sales for the second quarter increased 233 per cent over the first quarter, Rolls-Royce, Inc., reports, this pace being maintained

IN THE RETAIL FIELD

J. B. Lykke, proprietor of the Jefferson Garage, Springfield, Mass., has been appointed distributor for the Republic truck in that territory.

Charles H. Hellyar has bought from Gilbert T. Parks the latter's interest in the Trail Garage, Shelburne Falls, Mass.

Mador Pelland has opened an accessories store and oil and gasoline station at South Hadley Falls, Mass.

T. A. Costello has opened a large maintenance station in the building formerly occupied by the Sunset Sales & Service Co. at Springfield, Mass.

Hupmobile sales are to be handled in Topeka, Kan., through the Clevenger Motor Co., which has just been organized here. The salesroom of the company is at 205 West Sixth Avenue, and is in charge of W. T. Cowgill, who has been with the Franklin company. The Clevenger company will also handle Hupmobile parts. The Clevenger company now operates in Lawrence, Kan., under the direction of J. M. Clevenger, who has been the Hup dealer there for several years.

C. P. Beechinor, Turners Falls, Mass., has taken the agency for the Rickenbacker for Franklin county.

Roeske Motor Co., 420 Harrison street, Davenport, Ia., has announced discontinuance of the Maxwell and Chalmers lines and will devote its sales attention to the Oakland car. All new models are on the floor of its salesroom now.

The Platte Co., 111 Tenth Street S., Minneapolis, has obtained the distribution of the Stephens car in the Northwest. Taking over the plant on Tenth Street is part of the campaign by the new company. Bert A. Platte is president. He traveled four years in the Northwest for the Reilly-Herz Co. and more lately has been with the Dort.

Broadway Motor Sales Co. formally opened its fourth Chicago store Aug. 15 at 6335 Broadway. Paige, Jewett and Willys-Knight cars are handled in this new building. O. H. Bernstein is president of the company.

Kirkmyer Motor Co., Ford agents, at Richmond, Va., have decided to keep two branches, one in the uptown and the other in the downtown district. The firm has rented new quarters with 60,000 square feet of floor space, employed five new shopmen and four new salesmen.

Formation of the Dealers' Sales Corporation, a retail Moon agency owned by ten community dealers in Chicago, is announced by John Quinlan, president of the Quinlan Motors Co., wholesale distributor of Moon cars in Chicago. The company has salesrooms at 2029 S. Michigan Ave.

Arcade Motor Co., Little Rock, Ark., has filed a voluntary petition in bankruptcy in United States district court here through Clyde Page, secretary. Liabilities are listed at \$44,911.02 and assets at \$45,296.04.

Lutz-Griffith Co., incorporated, with capital of \$50,000, has been formed to take over distribution of Packards in Toledo and Northwestern Ohio. George P. Lutz, banker, and Warren E. Griffith, president of the Landman-Griffith Co., are principals in the new company. Harrison Yates, for 18 years with International Harvester Co., is secretary of the new company. Salesrooms are at 1719 Adams street.

JOINS A. E. A. STAFF

CHICAGO, Aug. 10—B. W. Ruark, formerly connected with the Champion Spark Plug Co. and later with the Pittsburgh Auto Equipment Co., has been appointed field secretary of the Automotive Equipment Association.

OVERLAND AND WILLYS SHIPMENTS

TOLEDO, Aug. 12—Total shipments of Overland and Willys-Knight cars for the first six months of 1922 lacked only 133 cars of being equal to the entire shipments for the entire year of 1921. Indications for the third quarter, the company reports, point to a continuance of this demand.

Production for this same period reached a total of 1,137,000 cars, an increase

L. & H. Motor Co. has been organized at Bloomington, Ill., by Ross C. Hall, James C. Byrne and Benjamin F. Lindheimer, all of Chicago, for the purpose of taking over the Buick agency at Bloomington, succeeding T. K. Hays who has had charge for the past six years. The Buick agency is located at 701 North Main street and is one of the finest plants in the city. The plans of Mr. Hays are not yet announced. The L. & H. Company has been incorporated for \$25,000.

Court Garage Co., Pekin, Ill., has moved into a new plant just completed at 502-4 Court street. The concern was recently organized with A. E. Severe as president; Henry Stockert, vice-president, and G. W. Fluegel, secretary-treasurer. The company will distribute the Dodge Bros. and Velie cars and also carry a complete line of motor car accessories.

Davis & Culver Motor Co., Galesburg, Ill., has removed from 199 South Prairie street to 131 North Cherry street, due to the necessity for larger floor space. The new location has four stories, enabling the company to pay adequate attention to the repair and storage departments. The Davis & Culver company distributes the Studebaker car in the Knox county territory. The new plant is one of the largest and finest of the city.

Poindexter-McCreery Motor Co. has been organized at Benton, Ill., and has opened a garage and sales agency at 301 East Main street. Capital stock has been fixed at \$20,000. The promoters are E. E. Poindexter, Kent Stetlar and J. A. McCreery. The company will distribute motor cars, trucks and tractors and also carry a line of accessories.

Oakland Motor Co., Decatur, Ill., has moved into a new sales building at 314 East Main street.

International Harvester Co. announces the establishment of a branch at Savannah, Ga., for the handling of International trucks in that territory. A service station is also maintained. M. A. Mongeau is manager of the branch.

Hanson-Nash Motor Co. has been organized at Tampa, Fla., by Charles E. Hanson, to handle Nash sales retail and wholesale in South Florida.

C. C. Baggs Auto Co., one of the largest Ford agencies in the South, has moved into a new building recently constructed for the company in Atlanta, at 137 South Pryor street.

Morris-Hall Motor Co. has been organized at Stone Mountain, Ga., by Ed M. Morris and Harry H. Hall, to handle Ford sales in that territory.

McBee Engine and Implement Co., Memphis, Tenn., local dealers for Mack trucks, Lee trailers, G. E. motors and other mechanical equipment, has established a sales and service agency for C-T electric motor trucks in the Memphis territory. John H. McBee, manager of the company, will have charge of the sales of electric and will transform a part of his large establishment at 348 Old Madison street into an electric truck service station.

Darling Motor Co. has been organized and has established a Ford agency and service station at Buckhead, Ga. The Southerland Motor Co., another recent organization, has established a Ford agency and service station at East Point, Ga.

of 75 per cent over the first six months of 1921, and of this total June produced 288,000, 61 per cent more than June, 1921.

Overland now has reached a production of 700 cars a day.

RAISIN DAY CLASSIC SEPT. 30

FRESNO, Cal., Aug. 12—The so-called Raisin-Day Classic, an automobile race of 150 miles, will be held here on Sept. 30, the date of the festival in honor of the harvesting of the raisin-grape crop of the San Joaquin Valley. The number of entries is limited to 12 and each must show speed of more than 100 miles an hour in the trial spins around the Fresno speedway prior to the race. Entries already made include Jimmy Murphy, Tommy Milton, Ralph de Palma, Harry Hartz and Joe Thomas.

Chicago, After Car Strike, Considers Municipal Busses

Mayor Wants City to Spend \$3,000,000 for Motor Vehicles—Governor Approves Plan

CHICAGO, Aug. 11—Just when Chicago was about to experiment on a large scale with municipally operated motor-bus transportation at a 5 cent fare to take the place of street cars transportation, the strike of street and elevated railway employees, which prompted the experiment, was ended. Mayor Thompson, who was back of the plan, stated, however, that he would proceed with the movement to have the city acquire and operate busses.

In the six days that the strike was on the city arranged for a number of privately owned busses to operate under the municipal banner, charging 5-cent fares. On the last day of the strike the number of such busses was 20. On the day following the end of the strike 11 of these busses discontinued the regular passenger business and returned to the carrying of sightseers.

Preceding the end of the strike, Mayor Thompson had asked the city council to appropriate \$3,000,000 for the purchase of busses. He announces that he will press this request, although it is by no means certain that it will be granted. Nevertheless, the splendid assistance given the passenger transportation problem in the city during the strike by the municipally operated and other privately owned and operated busses was such that many strong advocates have been won over to this form of transportation.

Among the most outspoken advocates of the motor bus is Gov. Len Small of Illinois, who issued the following statement in favor of municipally operated busses for Chicago:

"Mayor Thompson's establishment of people's ownership 5 cent fare motor bus service is a great thing for Chicago. It is more modern, more economical and faster than surface or L line electrical trains.

"Transportation, like everything else, is advancing, and has greatly improved in the last 20 years. It is entirely unnecessary to load up the streets with steel rails and heavy, noisy tram cars.

"First we had the horse cars. These were followed by the cable cars, which, in turn, gave way to electric cars. Now we have the motor bus. Chicago has ample authority to acquire a motor bus service, owned and operated by the people. For, after all, the streets belong to the people and anything necessary for their accommodation should be done.

"The streets were not intended solely to give somebody a chance to make money. That being the case, the streets should be used to give the people the most modern and economical transportation available. The motor bus affords that."

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Exchange of Cars Rescinded

Requirement for Recording Conditional Title Not Necessary Where Claim Does Not Hold Under Conditional Buyer

From the Supreme Court of Alabama comes a ruling that a conditional seller's title to an automobile under an unrecorded contract is good against one not claiming under the conditional purchaser. The Gray-Acree Motor Company sued the Gayle Motor Company for recovery of an automobile and obtained a judgment, which has been affirmed on appeal 90 Southern 334.

Plaintiff was the owner of the car it sued to recover, when in June, 1920, it made an exchange with defendant, being paid a difference in cash. About thirty days after this exchange the Royal Auto Company made claim to the car traded by plaintiff, exhibiting a conditional sale contract. It brought suit for and took possession of the car. Therefore, plaintiff sought to rescind its trade with defendant and asked for a return of its coupe from this defendant.

The question was presented whether or not the Royal Auto Company held the paramount title to the car traded by defendant to plaintiff. The facts showed that the Royal Auto Company was the owner in January, 1920, when it made a conditional sale thereof to one Cauley who resided in Mississippi. The contract was signed by both parties and reserved title in the seller until payment of the full purchase price, and contained a provision against the removal of the car from the state of Mississippi without the seller's consent. The Royal Company first learned the car was taken to Mobile, Alabama in July, 1920, and took steps immediately to recover the car. Cauley was then in default in payments. The defendant had purchased the car from the Southern Motors Corporation about April 20, 1920, or shortly after it was brought into the state.

These facts showed that the Royal Auto Company had a paramount title in the car at the time it was sold by defendant — unless the defendant came within the protection of the Alabama statute section 3394 of the Code of 1907, which provides for the recordation of conditional sales contracts.

On this point the Supreme Court says that the provisions of this statute protecting purchasers of property embraced in conditional sales contracts were intended only for those who purchased from or through the title of conditional buyer, relying upon the possession and apparent

The Readers' Clearing House

HIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department, but

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tim Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

ownership, the result of such conditional sale; otherwise the very basis for the statute would be undermined, which was that the conditional seller, having entrusted the conditional buyer with possession and having misled those purchasing from him to believe that his appearance of title was actual, was not thereafter in position to deny that the conditional buyer was the owner.

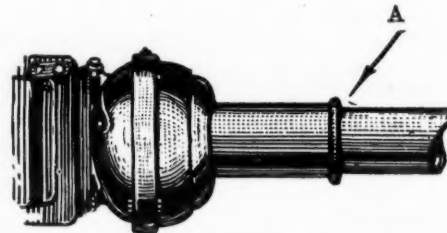
However, where one purchases through a chain of title other than from or through the conditional buyer, there will be no reason for applying such rule because such a purchaser does not purchase relying upon the appearance of title created by the conditional seller.

In this case the defendant purchased the car traded by it to plaintiff from the Southern Motors Corporation, but where the latter procured the car, or from whom, was not known. From lack of evidence on this point the court points out that the car may have been stolen and brought into the state. In any event it did not appear that the Southern Motors Corporation claimed any title under or through that of the conditional buyer, Cauley. The statute was intended to protect such persons only who claimed title from or under the conditional buyer; and the defendants were not protected by the statute since it was not shown that they claimed title through Cauley.

LOOSE BALL JOINT HOUSING PROBABLE CAUSE OF TORQUE TUBE NOISES

Q—We have been having trouble with the universal joint on an Overland Four. The car when coasting down hill or even on the level has a decided jump in the universal joint. We put in a new joint without results but after taking shims from universal ball cap and drawing up cap tighter the noise left for just a few trips. The owner tells us that this rattle started after a rear axle was put in but cannot see what effect that would have. The gears were checked and seemed to be adjusted correctly, also the bearing in rear of transmission, the driveshaft had no end motion and everything seemed in good shape. This is not present when engine is pulling.—Lost Creek Garage, Oakland Mills, Pa.

These symptoms indicate one of three troubles. First we would advise that there be a thorough examination of driveshaft assembly with special reference to the driveshaft where it enters the universal ball housing shown at "A" in cut below. Quite often the ball housing develops wear and the driveshaft housing is then allowed to work up and down in the ball housing which causes a very pronounced jump. We believe this is the most likely cause of the trouble because of the fact that you state the removal of several shims from the ball cap caused the elimination of the trouble for a few



trips. Would suggest that in order to determine whether this is the cause of the jump that you insert as much shim stock as possible between the ball joint housing and the torque tube or driveshaft housing, that is, sufficient shim stock to take up all play between driveshaft housing and universal ball joint housing.

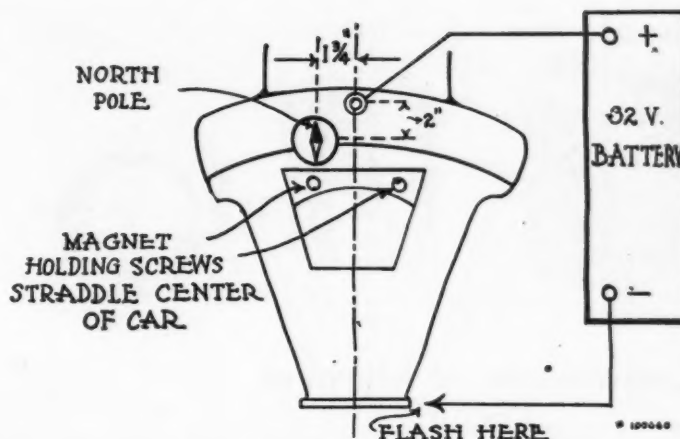
Two other possibilities present themselves. One is a loose pinion which cannot be detected unless the pinion is struck with a hammer or some other metallic article which will tell by the sound whether the pinion is loose on the taper. Looseness of the pinion would tend to produce the condition described in your letter. A third possible cause of trouble is worn keyways in the axle driveshaft. The method of checking on this is to remove the wheels and inspect very carefully the axle driveshaft, keys and keyways also the keyway in the rear wheel hub.

MISTAKES MADE IN CHARGING FORD MAGNETS

Q—Sometime ago we had a Ford car which was very hard to start. When warm it would run alright but occasionally would stop on the road. We figured that the trouble was due to the magneto and tried to recharge the magnets as per instructions in Motor AGE. The engine was removed and placed on a test stand and the magnets were tested and found to be very weak. We set the flywheel with one of the brass studs one inch to the left of center of the engine and used a 32 volt battery. Lamp cord was used, one wire being connected to the contact post and the other to the frame of the engine. This was left connected for a few seconds with the result that the magnets were completely demagnetized. Publish a sketch showing correct way to magnetize Ford magneto magnets and advise whether magnets should be directly in line with center of coil or not, if so they should be more than one inch to the left. Explain cause of demagnetizing the magnets in this case. Is this method of remagnetizing practical?—The "Service" Garage, Amelia, Va.

Your method of charging shows you have made a few mistakes. In the first place it is not necessary to remove the engine in order to do the charging job although of course this does no harm. In the second place the magnets should be exactly in line with the center of the coil although that could not have caused the trouble you have experienced. The 32 volt battery is alright but should not be connected for any length of time. The use of lamp cord is not advisable for two reasons. First it has such a high resistance that you cannot get enough current through to do the job right. Second, in the way you used it you no doubt got the wires reversed as the lamp cord being twisted makes it hard to tell which wire is positive and which negative unless you check it with a voltmeter.

Method of Setting Flywheel for Recharging Ford Magnets

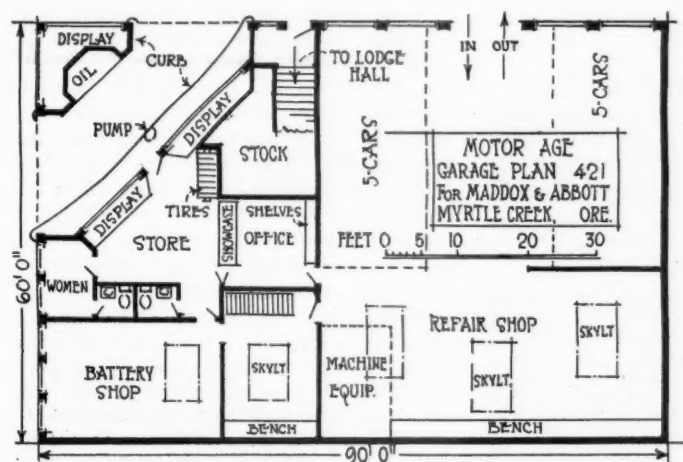


The figure of one inch to the left applies to the compass although 1 1/2 inches is more like the right figure, but as stated this was not the cause of demagnetizing the magnets. You probably have the current going just exactly the wrong way instead of the right way and the fact that you used lamp cord allowed only enough current to flow to weaken the magnets and not enough to charge them in the other direction. It is very difficult however to get magnets up to full charge if they are reversed. The figure above shows a diagram of the of the copper and does not include in the magneto.

Before placing the compass as shown it should be taken away from all machinery and checked to see whether the black or white end point towards the north of the earth, this is the North pole which in our case is shown as black. The positive end of the 32-volt battery can now be connected to the magneto terminal from which all other wires have

been removed. The negative wire can be flashed to the frame of the engine from 15 to 20 times. Do not hold it on or the coil will become overheated. The wires from plus to the terminal and minus to the frame should be good size, preferably wire having a diameter of about 1/8 inch, this being the dimension of the copper and does not include insulation.

This will carry heavy enough current to do the job right. Note that the magnet holding screws straddle the center of the car, and if the compass turns the wrong way the flywheel should be turned just the distance between these screws. The compass will then turn the right way. For best results this magnetizing process should be repeated at each quarter turn of the crank, each position being checked with the compass and brass stud position. This method is absolutely satisfactory when properly done, the process also being possible with a 24-volt battery.



Architectural Service

IN giving architectural advice MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among

other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

Corner Filling Station and Garage with Lodge Hall Above

PLAN NO. 421

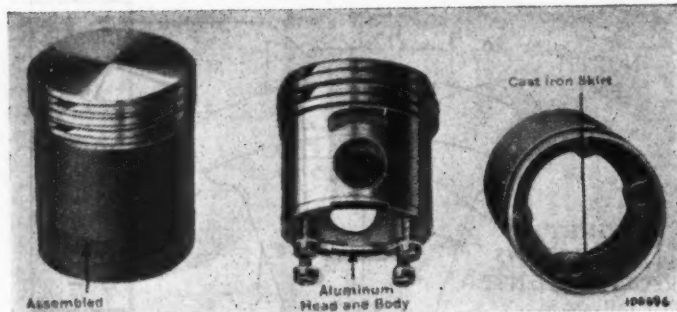
Q—Will you please send me plans for the following contemplated garage building: We are figuring on building a two-story building, the lower floor to be a public garage and the upper floor to be a lodge hall, club room, banquet room, kitchen and everything that goes with a lodge hall. The lower floor is to be a garage.

The building is to be built of concrete blocks on a corner lot 60 x 90 ft. There is to be a work shop in the rear of the garage, with storage and accessory room and office combined. There is also going to be a ladies' restroom, one door in the side of the lower floor going out on the side street and one in the front of the garage. I am going to have a gas and oil service station on the corner of the garage with the top floor extending out over the gas station. The stairway to the upper floor going up inside the building from the side street. Could you send us a plan that would be suited for this kind of a building?—Maddox & Abbott's Garage, Myrtle Creek, Ore.

There is nothing that musses up perfectly good space like a corner filling station. It not only uses a great deal of space but introduces so many acute angles into what is left that it is impossible to get a good layout.

With an added stumbling block in the Lodge Hall entrance we think we have done pretty well. We have been obliged to keep the battery shop in the front of the building which is against our principles but there is no other way for it. The garage cannot be narrowed and still be efficient; there is barely enough space for the shop and the store must face the filling station.

If your architect places posts in the garage he must place them so they will come between cars or you will find you can store only 8 instead of 10 cars.



The
Marmon
Piston

Construction of Marmon Piston

Q—Explain the construction of the new Marmon piston. We understand it is made of cast aluminum alloy.—Walter J. Young, Rosedale, Kas.

1—The Marmon 34 pistons are made of aluminum and cast iron. An aluminum die casting forms the piston head and upper portion. It carries three piston rings and the piston pin as well as the four studs which hold the cast iron skirt which makes up the lower portion of the piston. This skirt comprises a light cast iron cylinder whose only connection with the head portion is at the flange where they are bolted together.

This construction allows the aluminum head to expand or contract without affecting the diameter of the cast iron skirt and thereby combines all the advantages of both aluminum and cast iron pistons. If pistons are removed, care must be taken to see that they are replaced in the same cylinders and with the same side to the front of the engine, as originally.

To remove the piston pin from this type of piston, first remove the four nuts which are inside the piston at the lower end and pull the two halves apart. Then plunge the piston into boiling water and it will expand the piston sufficiently to allow the piston pin to be pressed out. This description is taken from the Marmon instruction book No. 2134.

HOME MADE TRANSFORMER

Q—We have made up a transformer for use in connection with a Tungar bulb for charging storage batteries. The core was made of strips of soft iron 5 inches long and 1 inch wide. We first used these iron strips to make an H-shaped frame on which the winding was placed. The top and bottom of the H were then closed up by using additional iron strips. For operating the filament we used 11 turns of No. 12 copper wire, using three wires in parallel. The rest of the winding was made up of No. 16 copper wire, there being 420 turns tapped at every 25 turns. The outfit seems to charge the battery all right but efficiency is very low, being only 25 per cent. We used two amperes at 110 volts from the line while charging a six volt battery at a 10 ampere rate. What is the cause of the inefficient operation.—Enns Bros., Reedley, Calif.

1—It is possible that the inefficiency is due to using only one battery as the efficiency curves of a regular Tungar catalog show only 30 per cent for charging one battery, while with 10 bat-

teries on at once the efficiency is 75 per cent. In figuring the efficiency you can also consider that the voltage of the six volt battery may be up to 7 or 7.5 which would bring your efficiency somewhat over 30 per cent.

Transformer design is a matter requiring a great deal of research and experiment which means that it is usually advisable to buy equipment of this kind rather than try to build it. In your case, however, we believe that making the iron out of straight strips combined with E shaped strips would have given slightly better operation.

With this construction the coil is formed first and then one E shaped and one straight strip are used to start building up the core. This gives a butt joint in the magnetic circuit and leaves no appreciable air space. In building up this iron core inside of the coil which is already wound you would first lay down one E shaped and one straight strip following it with a straight strip and E shape, so that the E shape strip would be first on one side of the core and then on the other so as to stagger the joints. Making the whole frame work out of straight strips you probably have overlapped the joints and consequently, have some air space which cuts down the efficiency of the iron magnetic circuit.

STOPPING "PINKING" KNOCK.

Q—Advise what can be done to stop the knock in a motor commonly called "pinking" or compression knock or spark knock which is caused by pre-ignition when the throttle is suddenly opened or when pulling hard up a grade. This occurs in a motor which is free from carbon and is equipped with a Zenith carburetor. We have believed that the real cause of this trouble which results in great loss of power on the hills is due to the low grade of fuel now being used. Would an extra head gasket or the use of Benzol in the gasoline help any? Give what information you can on this subject.—Kendall Cross, Solon Garage, Solon, Me.

1—The condition of knocking due to pre-ignition is as you state, produced by the low grade of fuel which has a tendency to detonate or fire spontaneously. We note that the Solon garage is an authorized Ford maintenance station and if the car referred to is a Ford car, it is possible that it has one of the old type cylinder heads, which gave higher compression than the cylinder head now being used. If this is the case, would suggest your trying a new head.

An extra gasket will be working in the right direction but will have only a slight effect whereas if several gaskets

are used you are taking a chance of having the force of the explosion blow out through the layers of asbestos in the gasket. You mention that a Zenith carburetor is used and in this connection it might be well to try a larger main jet or compensating jet so as to give a slightly richer mixture, as a lean mixture will aggravate this condition of knocking.

The use of Benzol mixed with the gasoline will help and we would suggest that you try out various mixtures, starting with 25 per cent Benzol and going up as high as 50 per cent Benzol. Retarding spark slightly on the hill will also help to overcome the knocking tendency.

Correcting Intake Manifold

Q—Is there any practical benefit to be derived from connecting the intake manifold of a motor to the crankcase or top of the radiator? What would be the effect in the combustion chamber? Would there be any material saving of gas from letting in this heated air. Would it give any increase in speed? What will be the heating effect? Will drawing steam or vapor from the radiator or crankcase have any tendency to keep carbon out of the motor?—Russell Sterett, care Hawesville Motor Co., Hawesville, Ky.

The Bureau of Standards having run tests in order to determine whether introduction of water vapor would produce any increase of power came to the conclusion that there was no appreciable advantage. Any slight improvement in the operation of the engine appears to be not an increase in power but rather a little smoother operation. This is possibly explained on the basis that the first generation of heat by the firing of the gasoline changes the water into steam or in other words spreads the force of the explosion and allows it to act a little more gradually instead of giving a sudden jerk or knock. The smooth running condition of an engine in the evening compared with its normal operation in the day time illustrates this point but dynamometer tests show that there is no increase in power.

It is very doubtful whether there is any appreciable effect in the combustion chamber. Also exceedingly doubtful as to there being any saving of gas under these circumstances. If there seems to be an increase in fuel economy or saving of gas it is doubtless true that the same economy would be obtained if better vaporization were obtained by introducing more heated air into the carburetor.

The claims made by devices of this character are often in excess of the real engineering features. For example, it is very often stated that water can be burned in the cylinder. As water is a product of combustion this corresponds to stating that ashes which have been totally consumed can be burned over again, and anyone who has even tried to use resifted ashes in a furnace realizes that there is but slight fuel value left.

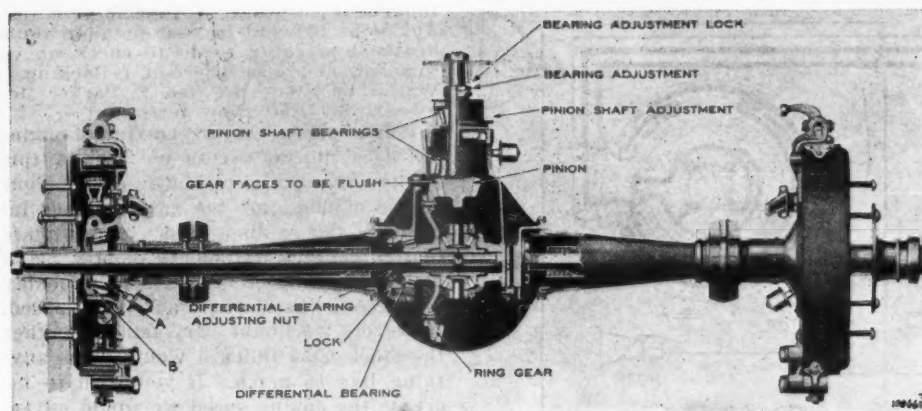


Fig. 1

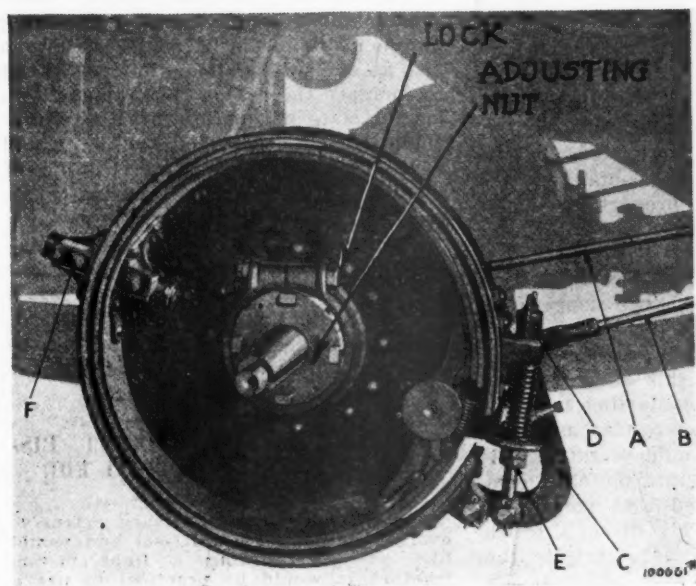


Fig. 2

Two views of Hudson rear axle, the upper showing section through the differential assembly. Lower, axle driveshaft adjusting nut and locking bolt, which must be removed to withdraw axle shaft.

DISASSEMBLING REAR AXLE OF HUDSON.

Q—Instruct as to proper procedure in disassembling rear axle of Hudson Super Six, style Eight, installing the new ring gear and pinion.—H. M. Wagner, Eminence, Mo.

1—The car should be jacked up so that the both rear wheels are off the ground. Remove both rear wheels. After wheels are removed access can be gained to the axle driveshaft adjustments, which are shown above. The locking bolt should be removed entirely, also the lock strip which has a hole through which the locking bolt passes and which fits into a slot in the adjusting nut. After this is removed the adjusting nut can be turned in a counterclockwise direction until the axle shaft on that side can be removed.

Repeat the operation on the other side of axle. The differential cover plate should be now removed and the differential carrier adjustments should be loosened and the differential carrier assembly removed. The differential carrier bearing lock and adjustments are shown in Fig. 1, these should be removed. After both cap screws on each side of the differential carrier have been removed the entire assembly can be taken from the axle housing. The pinion shaft universal

flange should be removed from its tapered seat on the pinion shaft after the rear universal has been dropped.

The pinion shaft adjustment bolt and lock should be removed and the pinion shaft with its bearings can then be removed by unscrewing the bearing adjustment and pinion shaft adjustment.

GENERATOR AIR GAP AFFECTS OPERATION

Give following information in regard to model G. K. Auto-Lite generator used on 1920 Overland 4.

Q—How much clearance should the armature have between armature and field poles?

1—This information is not available. However, when the machine is originally made mechanical inspection and checking of the bore and armature diameter should insure the parts as being the correct size.

2—What is the effect of having too much air gap between armature and field pole?

2—Excessive air gap makes it difficult for the lines of force to travel between field pole and armature so that the field is weak. This means that the generator will cut in late. For example, if it formerly cut in at 10 m.p.h. it may cut in at 12, 14 or 16 m.p.h. depending on how much the air gap has been increased.

The maximum charging current will also be reduced.

3—What is the effect if the armature rubs on the pole?

3—An armature rubbing on the pole will invariably generate enough heat to burn up in a short while. This is due to the iron becoming so hot that the cotton covering on the wires is burned away and the winding must then be replaced.

4—Can the armature be turned in a lathe to prevent its rubbing on the pole pieces, and what is the limit of the amount of stock that can be removed?

4—Generally speaking an armature should not require turning as rubbing on the pole pieces is due to trouble in the bearings or due to the end brackets being out of line. We have seen cases however, where it was so difficult to properly line up the bearings and end brackets that the armature was turned to remove a slight amount of material. This should be as little as possible however and only enough to prevent rubbing.

5—Would you consider that a generator charging 18 amperes would cause it to burn out?

5—This depends on the generator and how it is designed. The G. K. Auto-Lite generator to which you refer is supposed to charge 16 amperes cold and 12 hot, this amount being determined by the third brush setting. Eighteen amperes would apparently then be a little bit too much.

6—This generator has too much oil in it. Would this cause the armature to burn out?

6—Excessive oil usually does no permanent damage but gets into the brushes and mixes with the carbon dust causing a paste which produces a short circuit between the commutator bars, putting the generator temporarily out of business.

7—Where can I get a good service book on the different types of generators?—R. L. Wilhelm, Athol, S. D.

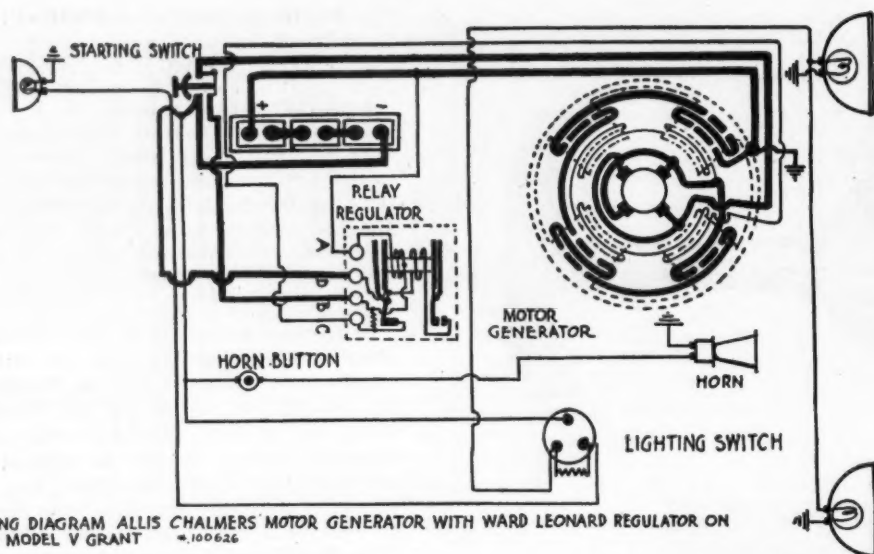
7—This information will be given by letter.

ELUSIVE KNOCK IN REO

Q—We have a four cylinder Reo car that knocks very badly when running about 15 m.p.h. After it gets hot although it does not show this knock when first started. The car has been overhauled and all weak places corrected. The motor seems to be in good condition otherwise. What is the cause of this trouble?—Varner's Garage, Sperryville, Va.

We are sending you by mail a sheet which gives 20 possible causes of knocks in engines and there may be some others that we have overlooked. The knocking when the engine is hot would seem to indicate a carbon knock or piston slap although bearings which are slightly loose may sound a little louder when the engine gets hot as when the engine is cold the oil is heavier and serves to fill up the space between the shaft and the bearings.

It is possible that in checking up the bearings and overhauling the engine that you have not used a connecting rod aligning gage and if so there is a chance that one or more of the rods are either twisted or bent. This condition is very difficult to determine without a gage and yet may account for the bearing loosening up and knocking within a short time after the overhauling.



WIRING DIAGRAM ALLIS CHALMERS MOTOR GENERATOR WITH WARD LEONARD REGULATOR ON 1916 MODEL V GRANT

ALLIS CHALMERS MOTOR GENERATOR ON MODEL D GRANT

Q—Publish internal circuits of motor generator and starting switch as used on 1916 model D Grant equipped with Allis Chalmers 6-volt motor generator. This machine operates perfectly as a generator, in fact with the regulator shorted out will generate as much as 35 amperes.

On the other hand when we try to use the starter it will not crank the engine. When the engine is warm however, it is possible to get the motor to turn over by closing and releasing the starter switch several times causing a rocking motion until the motor finally goes over compression. We have had this motor-generator apart and have resoldered all connections.

Have also installed a new set of brushes which have been fitted perfectly to the commutator. When the starting motor is locked the current draw is 190 amperes the voltage being 5.4. The same condition exists no matter whether the regular starting switch is used or whether an external battery is used with the cables connected to the starter. What is the cause of our trouble?—R. A. Parker, care of Acme Electric Auto Wks., Los Angeles, Calif.

If the voltage of 5.4 which you obtained when the starting motor was drawing current from the battery was taken at the starting motor itself there is no question but what the trouble is internal. The current of 190 amperes is very low as the average 6-volt machine will draw 400 or 500 amperes on lock torque. We therefore conclude that there is some high internal resistance in the starting motor.

The most likely place for this is in the new brushes which you have in-

stalled, which may be entirely suitable for action as a generator but may not be just right for starting-motor. In general brushes are made containing copper and graphite the proportion varying depending on the use to which they are put.

In machines operating merely as generators there is very little copper and a high percentage of graphite which gives good lubricating properties but has high resistance. If this same type of brush were used in a starting motor it would give very poor results as starting motor brushes should be rather yellow in color showing that the chief constituent is copper and that very little graphite is used. This gives a brush which, while it does not lubricate the commutator so well, acts better as far as current capacity is concerned. Should we be wrong in this assumption and the brushes be the correct type then the only possibility appears to be a loose connection in spite of the fact that you have soldered up everything.

To find this is not easy but can be done by exploring with a voltmeter. You can trace from the diagram the circuits through the starting motor and can possibly take voltage reading across the armature, brushes and series field winding while a heavy current is flowing. For example if you would find one volt lost across the field and one volt across the armature and the rest of the voltage or 3.4 volt across the brushes it would show an abnormal loss there which would account for your trouble.

BUICK C 36 HASN'T ENOUGH SPEED FOR READER

Q—We have a C-36 Buick 4 which we have rebuilt for speed work that is, we have completely overhauled the car, equipped it with DeLuxe pistons fitted with .0025 clearance, drilled the connecting rods and balanced them and did everything possible to put the car in first class condition. The valve timing is set ahead one tooth, and motor has excellent compression, plenty of power and pick up but have been unable to get more than 62 m.p.h. Have tried different spark settings and adjusted the carbure-

ter to every possible mixture but get no better results.

Th car has run about 6,000 miles since overhauled and seems to be well broken in. It has the standard 4 to 1 gearing in the rear end and 34x4 in. tires. I am using the regular Delco ignition and starting system which I had completely overhauled by the Delco branch in Philadelphia and the ignition is regular and shows a very hot spark. We understand from persons who have owned these cars that the stock and roadster was capable of 65 m.p.h. and feel that this car should show between 70 and 75. We are using the Standard Marvel carburetor and have

thought of installing a Rayfield or Miller. Advise as to what in your opinion would be the best thing to do to check up on this and find just where it is lacking.—Walter E. Allen, care Geo. B. Parker Motor Co., Mt. Holly, New Jersey.

It is apparent that the maximum engine speed is not in excess of 2600 in this particular car. You have either your choice of changing the gear ratio or increasing the engine speed. As you state that the engine has plenty of power and pickup a different gear ratio probably would give considerable additional speed. However, we doubt very much whether the stock C-36 Buick 4 would show anything like 65 m.p.h. If you wish to increase the engine speed we would advise raising the compression by installing pistons with greater compression length. Aluminum alloy pistons probably would enable you to secure a noticeably higher engine speed. A carburetor of as large a size as can be installed would also tend to increase the engine revolutions. You do not state whether or not the crankshaft has been balanced and we would advise that this be done as it is one of the greatest factors for securing maximum engine speed. Generally speaking this engine is not considered a high speed engine and we believe that the greatest speed can be secured by a change in the gear ratio. We would advise also that you experiment on the valve timing and try the engine with the regular Buick valve timing angle.

HIGH GRADE REPLACEMENT PISTONS WILL BE PRACTICAL FOR OLD MODEL CAR

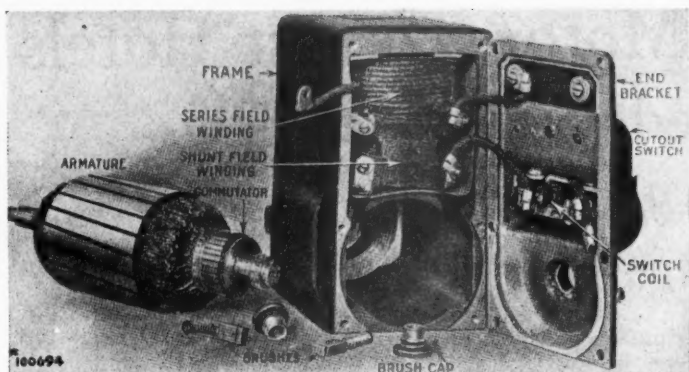
Q—We are doing some very extensive overhauling of a 6-48 Kissel and would like advice regarding a light piston, whether it would be practical to use a light piston in this engine or would it be more practical to use cast iron pistons manufactured for this engine. This engine is a 4 in. bore.—Ogden & Van Auker, Beaumont, Texas.

A light piston either cast iron or aluminum alloy would be entirely practical for use in this engine. The aluminum alloy piston is steadily gaining favor as regular equipment on American and foreign passenger automobile engines. If replacement pistons are used however it is advisable to secure the piston manufacturers recommendation as to the proper clearance for the particular engine in which they are to be installed.

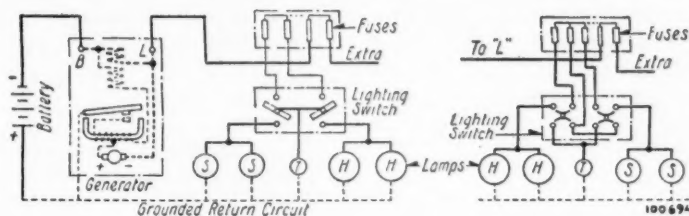
LOOK TO THE TIMING GEARS AS SOURCE OF NOISE

Q—We have just done work on a K-45 Buick which had a knock, more noticeable at about 10 m. p. h. It was also pumping oil and so we put in new rings, adjusted the main and connecting rod bearings but none of them were very loose. The car runs fine but has the same knock. I looked at the timing gears and they are worn some.—Sam Wilson, Lockesburg, Ark.

It is very probable that this engine needs new timing gears. The fact that main and connecting rod bearings are not loose would indicate the probability of such a theory. Would suggest that the engine be listed for piston slap also and that the cam shaft bearings be tested for tightness.



Westinghouse lighting generator frame No. 208. Internal connections and external circuits



WIRING DIAGRAM OF WESTINGHOUSE GENERATORS

Q—Give internal wiring diagram of No. 208-208 R and 209 Westinghouse generators.—M. V. Ledbetter, Denver, Colo.

1—Diagram of 208R generator is given in the July 20, 1922 issue of MOTOR AGE. The circuits of the 208 and 209 are identical, the only change in the 209 generator being a mechanical one, it being somewhat higher and having a large field coil. In the figures shown above are given both a picture of the Westinghouse 208 generator, shown with the end brackets removed, and a diagram giving internal circuits combined with external

wiring diagram. Referring to the picture of the generator, it will be quite evident where the leads go. At the far end of the generator which is not visible in the picture there are two leads going from the field coil down to the generator brushes. One way of connecting these two leads gives one rotation to the armature while crossing them gives another rotation. Therefore, if the machine rotates the wrong way it is only necessary to reverse the connections to the brushes.

CURTISS O. X. 5 ENGINE IN INTERNATIONAL TRUCK

Q—Give any information possible as to installing a Curtiss O. X. 5 airplane engine in an International one ton truck. What would be the best way to place present flywheel on same, if possible. If not, what kind could be attached?

1—Because of not knowing the dimensions of the International truck, especially the frame dimensions of the front where engine is usually mounted and the length of driveshaft, we are unable to give definite instructions as to best method of installing this engine. The flywheel may be installed by facing off the present flange or face on flywheel which formerly bolted to original International crankshaft. After this is done, face off to a surface sufficient to cover the Curtiss propeller hub flange, it will be an easy matter to locate it on the propeller hub, then locate and drill the holes for fastening.

Considerable caution should be exercised in fastening the flywheel, and after mounting on the propeller hub flange it should be carefully balanced as a unit with the crankshaft. Unless the engine is operated continuously at very low engine speed, that is around 200 or 250 r.p.m., a Ford flywheel will answer very nicely and the Ford 6-volt starter can be used.

2—Where can I secure a higher gear

for differential same as the International make only six to one, and, should I have to have one made special, where can this be done?—Chas. Halliburton, Meadow, S. D.

2—Unless you wish greater speed than the truck was originally capable of we would not advise a change in the gear ratio as the maximum speed of the International truck engine and the maximum speed of the Curtiss engine are practically identical. Gears that will enable you to secure a different ratio can be secured by communicating with any of the leading gear manufacturing firms whose names will be found in the advertising pages of MOTOR AGE.

MORE SPEED DATA

Q—We are writing you in regard to building racers out of Dodge and Maxwell cars and wish information as to concerns handling high speed gears.

1—Dodge cars are made into racers more frequently than Maxwell cars. Names of concerns handling gears will be given by letter.

Magneto on Maxwell

2—Will an Eisemann magneto be all right to use for a Maxwell car?

2—It is our opinion that any high tension magneto will be all right for the Maxwell car if it is in good condition and properly installed and timed.

3—Can we undersling the Maxwell car and what speed should we be ordinarily able to attain with Duck high speed equipment as can be obtained from companies already handling same?

3—Would suggest your writing to various wrecking concerns for axles suitable for underslinging the Maxwell car as we have no definite data on this. We are also uninformed as to what Duck high speed equipment may be and would appreciate information in regard to same if you have it available.

16 Valve Head

4—Is there a company making 16-valve heads for Maxwell cars of 1917 model?—Bert C. Dill, Oakes, N. D.

4—We do not know of any such concern. Would suggest that if you are interested in building Dodge racing cars that you look at page 42 of the June 29 issue of MOTOR AGE, which you should have on hand being a MOTOR AGE subscriber, as there was there given a very good description of a Dodge racing car.

CORRECTING GROWLER

Q—We have made up a growler out of flat strips of sheet iron approximately 2 in. by 6 in. These have been assembled to make an H shaped section on the center of which a coil was wound. In this coil we used 200 feet of No. 18 wire but found that the growler would pull so much current on a 110 volt A. C. that it would always blow the fuse. What is wrong with the design and how could it be corrected?—G. M. Elde, Decorah, Ia.

No. 18 wire has a resistance of 6.38 ohms per 1,000 feet. The 200-foot length would therefore have a resistance of 1/5 of this amount or 1.23 ohms for the 200-foot length. On direct current we find the current flow by dividing the volts by the resistance in ohms. Dividing 110 volts by 1.23 ohms we find that this winding would draw 90 amperes. On alternating current, however, the flow is always a great deal less depending on the magnetic nature of the circuit, although if there are no magnetic characteristics then the current would be the same as on direct current.

To exactly figure the flow that would take place with alternating current is rather a complicated problem and we would rather estimate and say that the iron frame work of the growler combined with the armature when in place produces a back E. M. F. which cuts the apparent flow of 90 amperes down to approximately 20 amperes which, however, accounts for your blowing ten or 15 ampere fuses.

If you would replace the No. 18 wire with No. 21 wire you would find that it would take 400 feet to fill up the same space, in other words you would have twice the length and twice the number of turns of wire just half the size. This would give four times the resistance and cut the apparent current to 22 amperes. Due to the alternating effect, however, we believe the actual current would be in the neighborhood of four or five amperes which should give good results so that a ten ampere fuse should be sufficient in the circuit.

Pacific Coast Chain of Motor Tourist Hotels to Be Completed Next Year

System Will Extend from Vancouver, B. C., South to San Diego and East to Spokane and Reno

CONSTRUCTION has been commenced at Sacramento, Cal., on the first of a chain of 20 motorists' hotels, announced in the July 6, issue of MOTOR AGE. These hotels will border the main highways of four states, from Vancouver, B. C., to San Diego, Cal., each located one day's comfortable driving from another, either north or south. The chain covers 2,700 miles of highways, at average intervals of 120 miles. These modernized "post-houses," to use a term familiar in the long-gone days of the stage coach and the predominance of the highway as an artery of travel, have been named "Rodomes," a contraction of the two words, "road" and "homes." The second will be constructed in Oakland, and work on it will start in October, while the third will be erected at Los Angeles, with construction starting in November.

The Sacramento Rodome will be completed and open for operation in November, if work proceeds as rapidly as it is now progressing, and the Oakland Rodome will be ready for business by Jan. 1, 1923. Land has been obtained for all 20 of the Rodomes, and if construction materials can be had promptly, the entire chain will be in operation by Nov. 1, 1923. This is the first time the project of a chain of combined hotels, garages, service stations, accessory stores and other conveniences for the touring motorist has been attempted. It is supported by the twenty cities in which the Rodomes are to be located, the motorists' organization of Washington, Oregon, Nevada and California; the automobile dealers' organizations of these four states, and all the chambers of commerce and other commercial organizations in the cities involved.

The work of organization of the American Travel System Corporation, which is developing the project, has been going on so quietly for two years that no word of it has reached the press, but it is now completely organized and financed by nine business men of the four states mentioned.

Each Rodome will be built and operated by a company organized in the town selected, all these companies to be controlled by the American Travel System Corporation, but each operated independently of the others except in the matter of making reservations for guests, transferring guests, purchase of supplies, and such similar co-operative features.

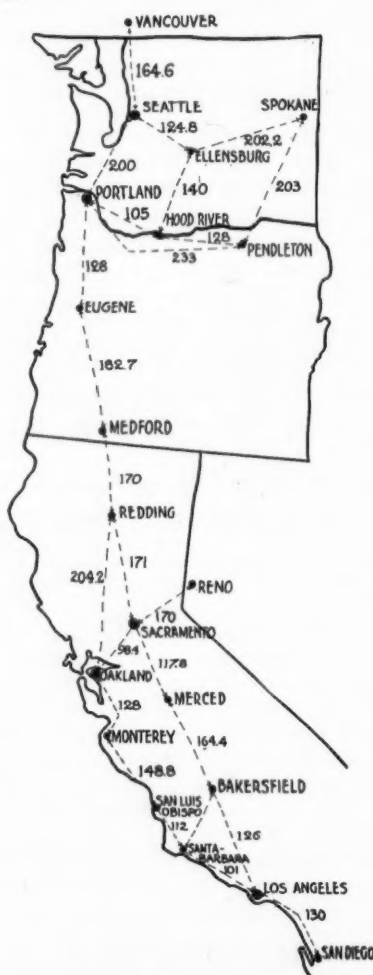
Electricity will be provided for lighting and either gas or electricity for cooking. Linen will be changed every day, and there will be a six-hour laundry in operation in connection with the Rodome.

Near the garages will be a battery of washing racks and pits, where the motorist may wash his own car, with water, hose, cloths and sponges furnished free, or he may have it washed at a nominal cost. At the garages also is stationed day and night an expert automobile mechanic who will inspect any car, advise repairs or changes necessary, and give the motorist any information he may need, free of charge.

A branch postoffice, telegraph and telephone station, and news stand will keep the travelers in touch with the world at large, and, more important still, enable them to make reservations for any future day or night at the next Rodome.

In the same building a service station and an equipment store will carry parts and accessories for all makes of cars. This is some contract, this matter of parts for ALL cars, but the management of Rodomes guarantees that it will make good on the promise. Minor repairs and temporary adjustments will be made here, but there will be no attempt to maintain a repair shop in the Rodome. Arrangements will be made, however, with a responsible repair man nearby to make such repairs as the motorists may need, at a flat rate, which will be plainly posted in all the garages in the Rodome, so that the motorist will know exactly what he will have to pay for any repair or adjustment on his car. He also will have the assistance of a competent automobile mechanic at the Rodome in determining just what he does need, and will not have to take the repair man's word for it.

Costs at which this service is to be sold are astonishingly low. The fixed charge for one or two persons, occupying one room, is \$2 per night; for four persons in two rooms, \$3, and for six persons in the largest apartments, \$4. Those motorists who have attempted to tour from hotel to hotel will appreciate these figures, and those who have attempted to tour from public auto park to public auto park will appreciate the service offered. Members of the automotive industry—altogether aside from motorists and automobile tourists—are very frankly enthusiastic over the Rodome idea, which is to get its first tryout in the world on the Pacific coast this year.



Map showing location of 20 proposed Rodomes. The system covers 2700 miles of paved highway

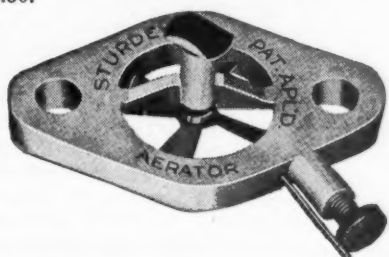
The apartments will range in size from one room with kitchenette, breakfast nook and bath, accommodating one or two persons, to three rooms, kitchenette and bath, caring for six persons, there being two beds in each room. These apartments will be completely furnished with everything necessary to housekeeping, including electric irons, and facilities for light laundry, with built-in ironing boards and similar equipment. Elec-

The ACCESSORY SHOW CASE

New Sources of Retail Profit

"AERATOR"

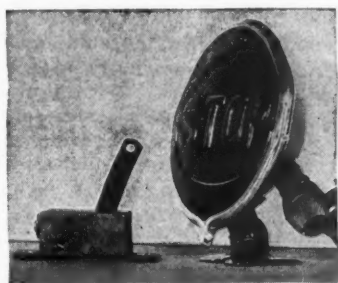
With the idea of improving the vaporization in the intake manifold the Federal Engineering Co., 45 Eighth Street, Detroit, Mich., has put out a device known as an "Aerator." This includes a propeller in the intake manifold which is rotated by the incoming gas, also an air intake in the manifold which contains a ball valve. The device retails for \$3.50.



AID STOP SIGNAL

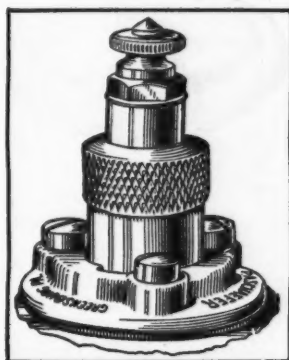
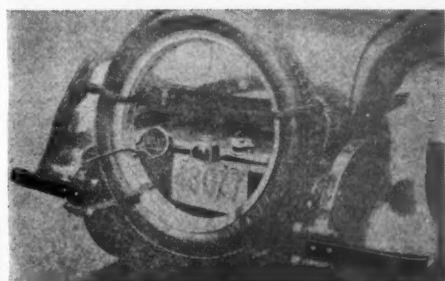
On releasing the brake pedal a two-pound spring pulls the knife out of contact. The whole is thoroughly insulated and protected from dirt and knocks by a steel box. The Universal bracket permits attachment to any point on the rear end. The lens revolves to read right however the body is set. It locks solidly against vibration.

A 21 candlepower nitrogen lamp is used. Aid Manufacturing Co., 2625-2631 Stewart Avenue, Chicago.



FENDAGARD FENDER PROTECTOR

The Fendagard attaches as shown in the accompanying illustration and is intended for rear fender protection without extra projection. \$5. Fendagard Mfg. Co., 138 Dwight st., Springfield, Mass.



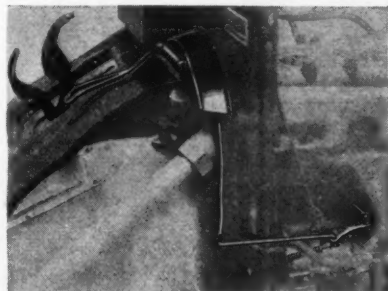
SHAEFER NuPOINT FOR FORDS

The Shafer NuPoint for Fords replaces the regular magneto point just above the transmission cover and permits of easy cleaning because it can be taken out with the hand. Price \$1.50. E. G. Overly, Greensburg, Pa.



FORD SAFETY CONTROL

This device is attached to the transmission cover and gives a double control from the front seat. It is intended to be attached to cars used for instructing how to drive a Ford and makes it possible for the instructor to throw out the clutch and apply the brake should an emergency arise. Price \$5.50. Selleck Mfg. Co., 710 Bank st., New London, Conn.

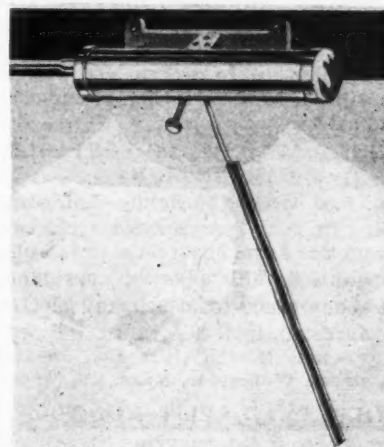


FARCO FOOT ACCELERATOR FOR FORDS

The feature of this foot accelerator for Fords is the manner of mounting on the dash entirely independent of the floor boards. It is not necessary to make any changes in the car to attach. Price, \$2.75. Farco Mfg. Co., 339 Church St., New York.

THORN AUTOMATIC WINDSHIELD WIPER

A small vacuum cup operates from the vacuum tank or intake pipe and it is powerful enough to at all times keep a generous arc of the windshield clear during rain or snow. The speed of the pump is adjusted by a small regulating thumb screw. \$5. Thorn Machine Tool Works, Syracuse, N. Y.

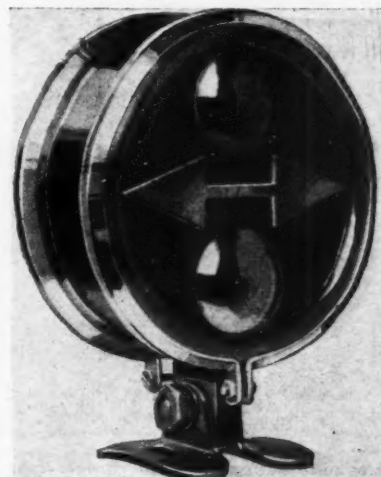


MAXI-MILE CORD

The Mason Tire & Rubber Co., Kent, O., has announced a new 30 by 3 1/2 cord tire, to be known as the Maxi-Mile. It will sell for \$11.80 and will have the same non-skid tread as the Mason Heavy Duty cord.

ARROW-LITE SIGNAL

The Arrow-Lite Signal shows left and right turns, go and stop signals. A red light in the upper oval indicates a stop, a green light in the lower oval, a clear road, and that the driver has the right of way. Left and right turns are shown by the red arrow in the center. Stover Signal Mfg. Co., Racine, Wis.



SERVICE EQUIPMENT

Aids for Time Saving & Accuracy

B. & E. WIRE TIPPER

For lamp socket, dry battery and wire-less connections—and any other, where a tipped wire is desired in preference to leaving wire bare.

No shorts from broken strands. Screw pressure is against the tip and not the wire, thus eliminating dangers of weakened strands pulling away from the contact point.

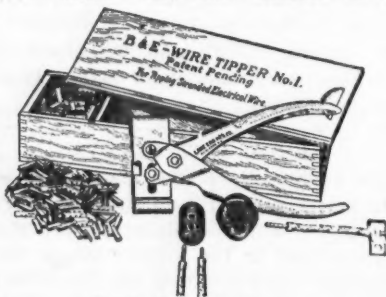
This tool is designed to tip the lightest and heaviest wires used in illumination and ignition. Also fitted with excess strand trimmer. Kit complete with 500 Tips as shown. Lake Erb Mfg. Co., 405 East 4th St., New York City, Manufacturers.

WHITE AUTOMOTIVE PORTABLE GARAGE LIGHT

In the White Portable Automotive Garage Light is incorporated a plug outlet which is brought directly to the place of operation. This adds the convenience of a ready place to attach any electrically operated tool needed in the work being done. O. C. White Co., 15 Hermon street, Worcester, Mass.

MILWAUKEE SPLIT RIM TOOL

The device is for removing tires or putting them on and handles split rims with a minimum of trouble. New stiff tires or old rusty rims can be handled with a saving in time. The tool fastens to the



B. & E. wire tipper



White automotive portable garage light



Milwaukee split rim tool



Auto hone



Force pump

AUTO HONE

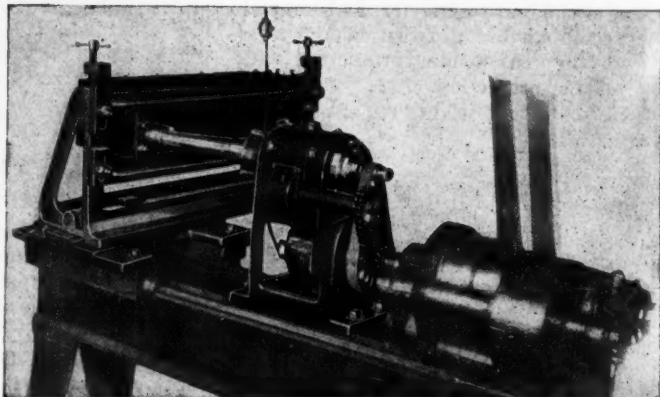
The Auto Hone is a device for cylinder regrinding. Operation is effected by attaching the Auto Hone to the electric drill and inserting the Auto Hone in the cylinder as shown in the cut. The Auto Hone Co., 1587 Main St., Buffalo, N. Y. Price is \$85 and \$95, depending upon the bore and stroke of the cylinders.

FORCE PUMP

The Force Pump is shown in the illustration below and sells for \$9.50 (without the barrel). The frame, gears, nozzle and handle of the pump are made of steel, the piston is a heavy bronze casting with two heavy piston rings. The lower part is one inch iron pipe and the piston housing is seamless steel tubing. Will pump any grade of gasoline or lubricating oil. Force Pump Co., 1821 Barbeau Ave., Chicago.

ELTECO CYLINDER GRINDING MACHINE

This machine is intended for use with a lathe of 14 in. or more swing. The work holder is mounted on the carriage of the lathe, the spindle head on the ways and the headstock of the lathe is used for imparting a rotary feed motion to the wheel spindle. Movement along the bed is obtained by the carriage of the lathe and the work holding block is provided with a screw 1-in. in diameter for transverse feed. The spindle is mounted on three self-aligning bearings and the main bearing is made of bronze. The rotary motion of the grinding spindle is obtained from the spindle of the lathe, a sprocket fastened on a taper fitting in the lathe spindle serving to drive a chain connected to the grinding machine. A 1-2 hp. motor furnishes the power for driving the grinding wheel. The spindle extension is 14 in. in length, the main spindle 4 3/4 in. in diameter and 9 5/16 in. long. Cylinder bores from 2 11/16 to 7 in. can be ground. The outfit weighs about 500 lbs.—The Liberty Tool Co., Irvington, N. J.



Elteco cylinder grinding machine

wall, work bench or stand. The two side arms grasp the rim and are operated by spoked handle which draws the arms in or out. Milwaukee Pattern & Mfg. Co., 1195 Thirtieth St., Milwaukee.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Toronto	..... Canadian Nat'l Exhibition	..... Aug. 26-Sept. 1
Columbus, O.	..... Columbus Auto Dealers Co.	..... Aug. 28-Sept. 3
Decatur, Ill.	..... Industrial Exhibition and Automobile Show	..... Aug. 30-Sept. 9
Indianapolis	..... Indianapolis Automobile Trade Assn.	..... Sept. 4-9
Wilmington, Del.	..... Delaware State Fair	..... Sept. 4-9
Hartford, Conn.	..... Connecticut Fair Grounds	..... Sept. 4-9
Spokane, Wash.	..... Annual Show	..... Sept. 4-9
Memphis	..... Memphis Automobile Dealers' Assn.	..... Sept. 23-30
Wash'gton, City of Closed Car Salon	.....	..... Oct. 21-28
Chicago	..... Annual Show of the Automotive Equipment Association	..... Nov. 13-18
New York	..... Annual Show	..... Jan. 6-13
Chicago	..... Annual Show at Coliseum	..... Jan. 6-13
	..... N. A. C. C.	..... Jan. 27-Feb. 3

CONVENTIONS

Buffalo, N. Y.	..... M. A. M. A. Fall Convention	..... Sept. 13-15
Chicago	..... Show Managers' Assn.	..... Sept. 14-15

FOREIGN SHOWS

Berlin	..... Kaiserdamm Hall	..... Sept. 25-Oct. 3
Rio de Janeiro	..... Automotive Exhibition	..... Sept., 1922
London	..... International Commercial Vehicle Exhibition	..... Oct. 12-13
Paris, France	..... Automobile Show	..... Oct. 4-15
London	..... Annual Show	..... Nov. 3-11

RACES

Colo. Spgs., Colo.	..... Pike's Peak Race	..... Sept. 4
San Carlos, Cal.	..... 500-Mile Armistice Day Race	..... Nov. 11

DOING ONE THING WELL

The dealer who is putting forth efforts to make his maintenance pay will not overlook the fact that properly selling gasoline and oil is an important part of his business. It must be dealt with and provided for the same as the operation of selling a customer a valve regrinding job or installing a new fender.

We are apt to get careless with the jobs we perform often. This is likely to be the case with selling customers gasoline and oil, because the operation especially in the average maintenance department of the small dealer, will be performed many times a day.

The attendant or mechanic who sells the customer gasoline and oil can organize his work and do just as good a job of it as the man in the shop who is going to straighten the crankshaft on customer's car. The difference is that he comes into direct contact with the customer and for that reason must be careful, tactful and polite.

He will be careful to see that the customer has shut off his engine and lights. He will be careful not to place the tank cap on the highly finished surface of a rear fender. Nor will he strike the rear body panel with the nozzle of the hose in trying to reach the fuel tank opening. He will be careful to place the cap on tightly when the tank is filled.

While filling the fuel tank he should tap the gauge occasionally. It may be stuck and gasoline may be spilled if he is not careful.

The attendant should carry a clean rag at all times to wipe off any fuel or oil accidentally spilled. Don't wait for the customer to do it. In lifting the hood for putting in oil, don't lay a grimy hand on it, or leave the hood handles and latches covered with a film of oil. It takes but a second to wipe them clean.

When you have done this, remove the radiator cap and see if water is needed. Do this whether the customer mentions it or not. The customer will appreciate the attention even if he does not need water. Always have the clean rag handy

to wipe any parts you have touched.

Have a chart at hand showing the price for any given amount of fuel and oil. The customer doesn't always feel like adding a lot of figures and he is impressed if you can tell him right off the bat what he has to pay.

In selling oil be sure that the customer gets the grade of oil which the chart of recommendation you have on hand shows to be the proper grade for his particular make of engine. Always refer to the chart when the customer or you are not sure as to the required grade of lubricant.

Be tactful. If you see that the tail

light on a customer's car does not light, tell him about it. It may save him a fine. Maybe he knows about it, but whether he does or not should not affect your mentioning it. If you think he needs air in one or two tires, tell him so. While you are filling the tank feel of his spare tire. Maybe it is soft and he does not know it. You have air at your maintenance station, let him have it. He may let you have his money for a new tube.

Finally, be polite. You expect the service manager to tip his cap to a woman customer, so why not the attendant at the gasoline pump when he is greeted with a smile and she says "Five gallons, please."

Don't forget to have the attendant "Ask 'Em to Buy" anything that he sees is needed. Pay him for all sales made.

An Effective Display of a Small Article



No matter the size of the article you wish to display, it can be so arranged as to attract attention if artistically set in a window as in the case of the Jackson Motor Supply Co., Pittsburgh, which, in an effective manner, dressed their window with Kester Solder tubes and posters

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Acason.....	1 1/2	\$1050a	3 1/2 x 5	34x5n	34x5n	W	Corbitt.....D-22	1 1/2	\$2200	3 1/2 x 5	34x3 1/2	34x5	W	Geraix.....	3 1/2	\$1500	4 1/2 x 6	36x5	40x12	W
Acason.....RB	1 1/2	1950	3 1/2 x 5 1/2	36x3 1/2	36x6	W	Corbitt.....C-22	2	2600	4 1/2 x 5 1/2	36x3 1/2	36x7	W	Graham Bros.....	1	1265	3 1/2 x 4 1/2	33x4 1/2	34x5n	B
Acason.....H	2 1/2	2750	4 1/2 x 5 1/2	36x4 1/2	36x8 1/2	W	Corbitt.....B-22	2 1/2	3000	4 1/2 x 5 1/2	36x4	36x7	W	Graham Bros.....	1 1/2	1325	3 1/2 x 4 1/2	33x4 1/2	34x5n	B
Acason.....L	3 1/2	3450	4 1/2 x 5 1/2	36x5 1/2	36x10 1/2	W	Corbitt.....R-22	3	3200	4 1/2 x 5 1/2	36x4	36x8	W	'Gramm-Pion. 10	1	1245	3 1/2 x 5	33x5n	33x5n	B
Acason.....M	5	4350	5 x 6 1/2	36x6	40x12	W	Corbitt.....A-22	3 1/2	3800	4 1/2 x 5 1/2	36x5	36x10	W	'Gramm-Pion. 15	1 1/2	1750a	3 1/2 x 5	36x3 1/2	36x5 1/2	W
Acason.....C	1 1/2	2295	3 1/2 x 5 1/2	34x3 1/2	34x5 1/2	W	Corbitt.....AA-22	5	4500	4 1/2 x 6	36x6	40x6 1/2	W	'Gramm-Pion. 65	1 1/2	2250a	3 1/2 x 5	36x3 1/2	36x5	W
Acason.....A	2 1/2	2795	4 1/2 x 5 1/2	36x4 1/2	36x7	W	Day-Elder.....AS	1	1600	3 1/2 x 5	35x5n	35x5n	W	'Gramm-Pion. 20	2	2475a	4 1/2 x 5 1/2	36x4 1/2	36x7 1/2	W
Acme.....20	1	.....	3 1/2 x 5	35x5n	35x5n	W	Day-Elder.....B	1 1/2	2000	3 1/2 x 5	34x3 1/2	34x5	W	'Gramm-Pion. 30	3	3300a	4 1/2 x 5 1/2	36x4 1/2	36x4 1/2	W
Acme.....30	1 1/2	.....	3 1/2 x 5	34x3 1/2	34x5	W	Day-Elder.....D	2	2400	4 1/2 x 5 1/2	36x4	36x7	W	'Gramm-Pion.75P	3 1/2	4225a	4 1/2 x 5 1/2	36x6n	42x9n	W
Acme.....40	2	.....	3 1/2 x 5	34x3 1/2	34x5	W	Day-Elder.....E	3 1/2	3150	4 1/2 x 5 1/2	36x5	36x5 1/2	W	'Gramm-Pion. 40	4	3850a	4 1/2 x 5 1/2	36x5	36x5 1/2	W
Acme.....60	3	.....	4 1/2 x 5 1/2	36x4	36x7	W	Day-Elder.....F	5	4250	4 1/2 x 6	36x5	40x6 1/2	W	'Gramm-Pion. 50	5-6	4450a	4 1/2 x 6	36x6	40x6 1/2	W
Acme.....60L	3	.....	4 1/2 x 5 1/2	36x5	40x10	W	Dearborn.....E	1	1600	3 1/2 x 5 1/2	35x5n	35x5n	W	Hahn.....B2	1	1750	3 1/2 x 5	34x5 1/2	34x5 1/2	W
Acme.....90	4 1/2	.....	4 1/2 x 5 1/2	36x6	40x12	W	Dearborn.....FX	1 1/2	2300	3 1/2 x 5 1/2	34x4	34x5	W	Hahn.....O	1 1/2	2150	3 1/2 x 5 1/2	36x3 1/2	36x5 1/2	W
American.....25	2 1/2	3350	4 1/2 x 6	36x4 1/2	36x4 1/2	W	Dearborn.....F	1 1/2	2180	3 1/2 x 5 1/2	34x4	34x5	W	Hahn.....K	2	2550	4 1/2 x 5 1/2	36x4 1/2	36x7 1/2	W
American.....40	4	4275	4 1/2 x 6	36x5 1/2	36x5 1/2	W	Defiance.....48	2	2590	3 1/2 x 5 1/2	34x4 1/2	34x7	W	Hahn.....L	3	3350	4 1/2 x 5 1/2	36x5 1/2	36x8 1/2	W
Armleder.....20	1	.....	3 1/2 x 5 1/2	34x3 1/2	34x6 1/2	W	Defiance.....G	1	1095a	3 1/2 x 5	35x5n	35x5n	B	Hahn.....M	5	3850	4 1/2 x 5 1/2	36x5	36x10	W
Armleder.....21	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x6 1/2	W	Defiance.....D	1 1/2	2095a	3 1/2 x 5	35x5n	36x0n	W	Hahn.....N	6	4250	4 1/2 x 6	36x6	40x12	W
Armleder.....40-B	2 1/2	.....	4 1/2 x 5 1/2	36x4 1/2	36x7 1/2	W	Defiance.....E	2	2275a	3 1/2 x 5	35x5n	36x7n	W	Hal-Fur.....E	1 1/2	2350	4 1/2 x 5 1/2	34x5n	36x7n	W
Armleder.....40-C	2 1/2	.....	4 1/2 x 5 1/2	36x4 1/2	36x7 1/2	W	Denby.....31	1 1/2	1485	3 1/2 x 5	35x5n	35x5n	B	Hal-Fur.....B	2 1/2	3000	4 1/2 x 5 1/2	36x6n	36x5	W
Armleder.....HW-B	2 1/2	.....	4 1/2 x 5 1/2	36x5 1/2	36x5 1/2	W	Denby.....33	1 1/2	2145	3 1/2 x 5	35x5n	36x7n	W	Hal-Fur.....F	3 1/2	4000	4 1/2 x 5 1/2	36x6n	40x10	W
Armleder.....KW-B	3 1/2	.....	4 1/2 x 6	36x5 1/2	36x5 1/2	W	Denby.....34	2	2395	3 1/2 x 5	36x3 1/2	36x6	W	Hall.....1	1 1/2	3100	3 1/2 x 5	34x4 1/2	34x5n	W
Armleder.....KW-C	3 1/2	.....	4 1/2 x 6	36x5 1/2	36x5 1/2	W	Denby.....35	2 1/2	2795	4 1/2 x 5 1/2	36x4	36x7	W	Hall.....2	2 1/2	3275	4 1/2 x 5 1/2	36x4	36x6	W
Atlas.....MD	1	1185	3 1/2 x 5	32x4 1/2	32x4 1/2	W	Dependable.....A	1	1050	3 1/2 x 5	36x6	40x6 1/2	W	Hall.....3	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x5 1/2	W
Atterbury.....20R	1 1/2	2475	3 1/2 x 5	34x3 1/2	34x5	W	Dependable.....C	2	2350	3 1/2 x 5	34x5	34x5	W	Hall.....5	5	5100	4 1/2 x 5 1/2	36x5	40x6 1/2	W
Atterbury.....7CX	2 1/2	3175	4 1/2 x 5 1/2	36x4	36x4 1/2	W	Dependable.....D	2 1/2	2050	4 1/2 x 5 1/2	34x5	34x5	W	Hall.....7 chain	7	5100	4 1/2 x 5 1/2	36x5	40x6 1/2	C
Atterbury.....22C	2 1/2	3375	4 1/2 x 5 1/2	36x4	36x4 1/2	W	Diamond T.....O-3	1-1 1/2	1975	3 1/2 x 5	36x3 1/2	36x4n	W	Harvey.....WFA	2 1/2	2650	4 1/2 x 5 1/2	34x4	34x7	W
Atterbury.....7D	3 1/2	3975	4 1/2 x 5 1/2	36x5	40x5 1/2	W	Diamond T.....T	1 1/2	2250	3 1/2 x 5	36x3 1/2	36x5	W	Harvey.....WHA	3 1/2	3950	4 1/2 x 6	36x5	36x5 1/2	W
Atterbury.....22D	3 1/2	4275	4 1/2 x 5 1/2	36x5	40x5 1/2	W	Diamond T.....K	3 1/2	3750	4 1/2 x 5 1/2	36x5	36x5 1/2	W	Hawkeye.....K	1 1/2	1850	3 1/2 x 5 1/2	34x3 1/2	34x5 1/2	W
Atterbury.....8E	5	4975	4 1/2 x 6	36x5	40x6 1/2	W	Diamond T.....EL	5	4325	4 1/2 x 5 1/2	36x6	40x6 1/2	W	Hawkeye.....M	2	2650	4 1/2 x 5 1/2	36x4	36x6	W
Autocar.....21UF	1 1/2	1950	3 1/2 x 5 1/2	34x1 1/2	34x5 1/2	D	Diamond T.....S	5	4500	4 1/2 x 6	36x6	40x6 1/2	W	Hawkeye.....N	3 1/2	3700	4 1/2 x 6	36x5 1/2	36x10 1/2	W
Autocar.....21UG	1 1/2	2050	3 1/2 x 5 1/2	34x1 1/2	34x5 1/2	D	Diehl.....A	1	.....	3 1/2 x 5	36x6	36x6	W	Hawkeye.....O	1 1/2	2200	3 1/2 x 5	36x4n	36x5n	W
Autocar.....27H	2	2950	4 x 6 1/2	34x5	36x7	D	Diehl.....B	1 1/2	4100b	4 1/2 x 5 1/2	36x5	36x7	W	Hendrickson.....O	1 1/2	2200	3 1/2 x 5	36x4n	36x5n	W
Autocar.....27K2	2	3075	4 x 6 1/2	34x5	36x7 1/2	D	Doane.....2	1 1/2	5100b	4 1/2 x 5 1/2	36x5	36x5 1/2	W	Hendrickson.....N	2 1/2	2600	4 1/2 x 5 1/2	36x4 1/2	36x7 1/2	W
Autocar.....26Y	5	3450	4 1/2 x 5 1/2	36x5	36x12	D	Dodge Brothers.....	730	3730	3 1/2 x 4 1/2	32x4n	32x4n	W	Hendrickson.....M	3 1/2	3000	4 1/2 x 5 1/2	36x5 1/2	36x5 1/2	W
Autocar.....26-B	5	4100	4 1/2 x 5 1/2	36x5	36x12	D	Dorris.....K-2	2-2 1/2	3400	4 1/2 x 5 1/2	36x4	36x7	W	Huffman.....B	1 1/2	1795	3 1/2 x 5	34x3 1/2	34x6	W
Available.....H1 1/2	1 1/2	2475	4 x 5	36x3 1/2	36x5 1/2	W	Dorris.....K-7	3 1/2	4400	4 1/2 x 5 1/2	36x5	36x10	W	Huffman.....C	1 1/2	1695	3 1/2 x 5	36x3 1/2	36x6	W
Available.....H2	2	2775	4 x 5	36x3 1/2	36x6 1/2	W	Dort.....103	3 1/2	685a	3 1/2 x 5	34x4n	34x4n	B	Huffman.....D	2-3	2895	4 1/2 x 5 1/2	36x4	36x7	W
Available.....H2 1/2	2 1/2	3160	4 x 5	36x3 1/2	36x8 1/2	W	Double Drive.....B	3	4000	4 1/2 x 5 1/2	36x6	36x6	W	Indiana.....A-A	1-1 1/2	1950	3 1/2 x 5	34x5n	34x5n	W
Available.....H3 1/2	3 1/2	4175	4 1/2 x 5 1/2	36x5	40x5 1/2	W	Duplex.....A	2	2775	4 x 5 1/2	35x5n	36x7n	W	Indiana.....B-B	2-2 1/2	2800	4 1/2 x 5 1/2	36x4	36x4 1/2	W
Available.....H5	5	5375	5 x 6	36x6	40x12	W	Duplex.....E	3 1/2	3500	4 1/2 x 5 1/2	36x8	36x8	I	Indiana.....C-C	3-3 1/2	3475	4 1/2 x 5 1/2	36x5	36x5 1/2	W
*Avery.....1	1	.....	3 x 4 1/2	31x5n	31x5n	I	Duty.....22	2	1500	3 1/2 x 5	34x3 1/2	34x5	I	Indiana.....D-D	4-4 1/2	4150	4 1/2 x 6	36x5	36x6 1/2	W
Beck.....A Jr.	1 1/2	1285a	3 1/2 x 5	34x3 1/2	34x4 1/2	I	Eagle.....101	1 1/2	1875	3 1/2 x 5 1/2	34x5	34x5	I	Indiana.....E-E	6-6 1/2	4850	4 1/2 x 6 1/2	36x6	40x6 1/2	W
Beck.....B-30	1 1/2	1725	3 1/2 x 5	34x5	36x6	W	Eagle.....100-2	2	2275	3 1/2 x 5 1/2	34x4 1/2	34x7 1/2	W	Indep'd (Iowa).....B	1	1665	3 1/2 x 5	34x3 1/2	34x4	I
Beck.....C-40	2	1810	3 1/2 x 5	36x6	36x6	W	F. W. D.....B	3	4200	4 1/2 x 5 1/2	36x6	36x6	B	Indep'd (Iowa).....O	1 1/2	2040	3 1/2 x 5 1/2	34x3 1/2	34x5	W
Beck.....D-50	2 1/2	2395	4 1/2 x 5 1/2	36x7	40x8	W	Fageol.....1 1/2	1 1/2	3000	3 1/2 x 5 1/2	34x3 1/2	34x6 1/2	W	Indep'd (Ia).....HI	1 1/2	2040	3 1/2 x 5 1/2	36x4	36x7	W
*Bell.....(Penn.)	1 1/2	1000b	3 1/2 x 5	31x4n	31x4n	B	Fageol.....2 1/2	2 1/2	3900	4 1/2 x 5 1/2	36x5 1/2	40x5 1/2	W	Indep'd (Ohio).....F	1 1/2					

Specifications of Current Motor Truck Models—Continued

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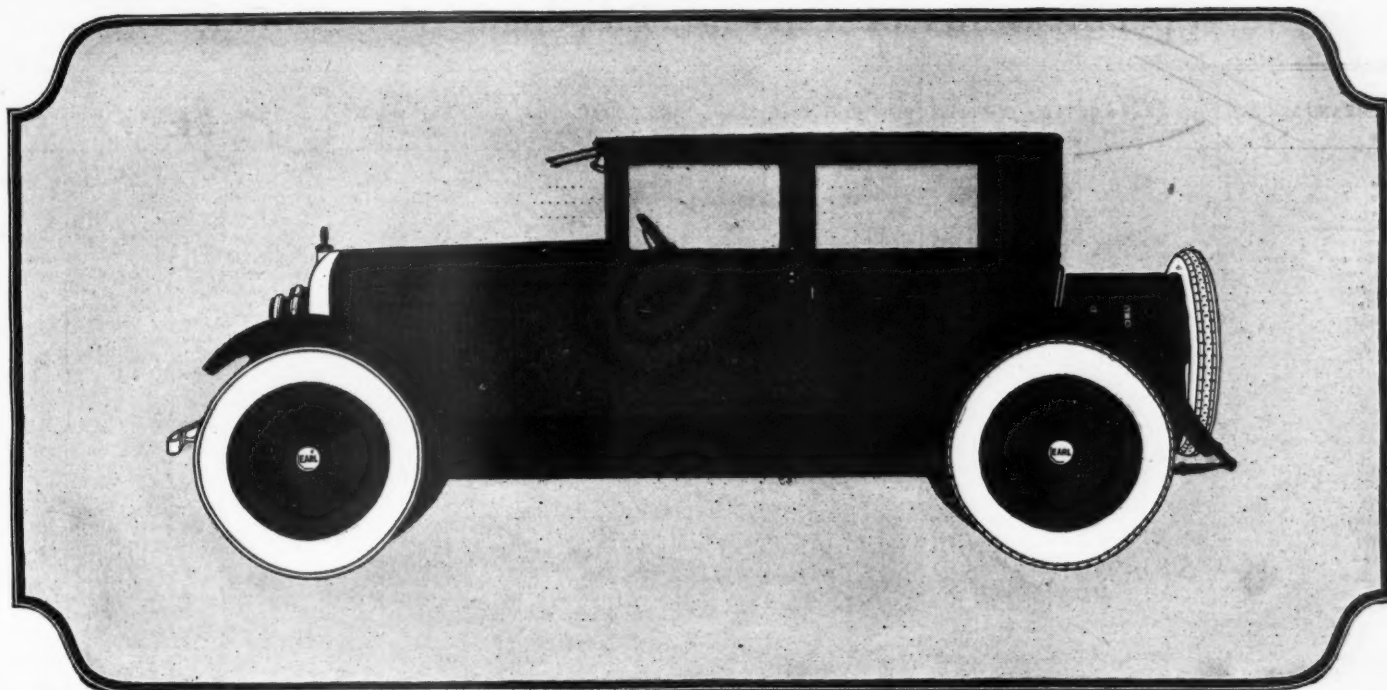
Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive
Vim.....30	1 1/2	\$1175	3 1/2 x 5 1/2	32 x 4 1/2 32 x 4 1/2	W	White.....40	3 1/2	\$1200	3 1/2 x 5 1/2	30 x 5 40 x 5 d	D	Wichita.....O	4	\$3500	4 1/2 x 6 1/2	30 x 5 30 x 5 k	W
Vim.....31	1 1/2	1975	3 1/2 x 5 1/2	35 x 5 35 x 5 m	W	White.....45	5	4500	4 1/2 x 5 1/2	30 x 5 40 x 5 d	D	Wilcox.....AA	1 1/2	1900	3 1/2 x 5 1/2	30 x 4 30 x 4 k	W
Vim.....22	2	3150	3 1/2 x 5 1/2	30 x 4 30 x 6	W	White Hick.....E	1	1225	3 1/2 x 5 1/2	34 x 5 34 x 5 m	W	Wilcox.....BB	1 1/2	2550	4 1/2 x 5 1/2	30 x 4 30 x 4 k	W
Vim.....23	3	3950	4 1/2 x 5 1/2	30 x 5 30 x 5 d	W	White Hick.....H	1 1/2	1375	3 1/2 x 5 1/2	30 x 3 1/2 30 x 5	W	Wilcox.....DD	2 1/2	3000	4 1/2 x 5 1/2	30 x 4 30 x 3 1/2 k	W
Walker-Johnson A	2	2250	3 1/2 x 5 1/2	34 x 3 1/2 34 x 6	W	White Hick.....K	2 1/2	1675	4 1/2 x 5 1/2	30 x 4 30 x 5	W	Wilcox.....EE	3 1/2	3950	4 1/2 x 5 1/2	30 x 5 30 x 5 k	W
Walker-Johnson B	3	2750	4 1/2 x 5 1/2	30 x 4 30 x 8	W	Wichita.....K	2	1875	3 1/2 x 5 1/2	30 x 3 1/2 30 x 4 k	W	Wilcox.....FF	6	4350	4 1/2 x 6 1/2	30 x 5 40 x 6 d	W
Walter.....M	2 1/2	3850	3 1/2 x 5 1/2	30 x 1 30 x 8	D	Wichita.....M	1	2400	3 1/2 x 5 1/2	30 x 3 1/2 30 x 6 k	W	Wilson.....F	1 1/2	2270	3 1/2 x 5 1/2	30 x 3 1/2 30 x 5	W
Walter.....S	5	4850	4 1/2 x 5 1/2	30 x 6 40 x 6 d	W	Wichita.....RX	3	3200	4 1/2 x 5 1/2	30 x 4 k 30 x 8 k	W	Wilson.....EA	2 1/2	2825	4 1/2 x 5 1/2	30 x 4 30 x 7	W
*Watson.....C	1	1465	3 1/2 x 5 1/2	35 x 5 35 x 5 m	W							Wilson.....G	3 1/2	3085	4 1/2 x 5 1/2	30 x 5 30 x 5	W
Watson.....N	3 1/2	4250	4 1/2 x 5 1/2	30 x 5 30 x 10	W							Wilson.....H	5	4520	4 1/2 x 6 1/2	30 x 6 40 x 6	W
Western.....W1	1 1/2	2550	4 1/2 x 5 1/2	30 x 3 1/2 30 x 5 k	W							*Wisconsin.....A	1	1750	3 1/2 x 5 1/2	34 x 5 34 x 5 m	W, B
Western.....L1	1 1/2	2550	4 1/2 x 5 1/2	30 x 3 1/2 30 x 5 k	W							Wisconsin.....B	1 1/2	2100	3 1/2 x 5 1/2	35 x 5 30 x 6	W
Western.....L2	1 1/2	2550	4 1/2 x 5 1/2	30 x 3 1/2 30 x 5 k	W							Wisconsin.....C	2 1/2	2700	4 1/2 x 5 1/2	30 x 6 30 x 7	W
Western.....L3	1 1/2	3250	4 1/2 x 5 1/2	30 x 4 30 x 7	W							Wisconsin.....D	3 1/2	3000	4 1/2 x 5 1/2	30 x 6 40 x 8	W
Western.....W3	3 1/2	4250	4 1/2 x 5 1/2	30 x 5 40 x 5 d	W							Wisconsin.....E	5	3500	4 1/2 x 6 1/2	30 x 6 30 x 10	W
*White.....15	1 1/2	2400	3 1/2 x 5 1/2	34 x 5 34 x 5 m	B							Wisconsin.....F	7	4000	5 x 6 1/2	30 x 6 30 x 12	W
White.....20	2	3250	3 1/2 x 5 1/2	30 x 4 k 30 x 7 k	D							Witt-Will.....N	1 1/2	2450	3 1/2 x 5 1/2	30 x 3 1/2 30 x 5 k	W
												Witt-Will.....P	2 1/2	2900	4 1/2 x 5 1/2	30 x 3 1/2 30 x 7 k	W

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.
r—8 cyl. s—6 cyl. t—2 cyl., all others are 4 cyl.
d—dual tires, k—pneumatic tires optional at extra cost, n—pneumatic tires, a—price includes several items of equipment, b—price includes body, *—express truck or delivery wagon, **—Canadian Make, trac—tractor.

Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity
Allis-Chal. G.P.	6-12	\$250	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Fordson.....	18-30	\$395	4	Own	4-4 x 5	G, K	2	Oldsmar.....K	2 1/2-5	\$225	4	Own	1-5 1/2 x 5 1/2	Gas.	1
Allis-Chalm.....	15-25	1185	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Franklin.....G	18-30	4000	2	Clim.	4-5 x 6 1/2	G or K	3-4	Peoria.....L	12-25	1600	4	Clim.	4-5 x 6 1/2	G, K	3
Allis-Chalm.....	20-35	1885	4	Own	4-4 1/2 x 6 1/2	GorK	3-4	Franklin.....C	18-30	3350	2	Clim.	4-5 x 6 1/2	G or K	3-4	Pioneer.....G	18-36	1750	4	Own	4-5 1/2 x 6 1/2	G, K, D	4
*Allis-Chalm.....	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Franklin.....G2	18-30	4350	2	Clim.	4-5 x 6 1/2	G or K	3-4	Pioneer.....C	40-75	3550	4	Own	4-7 x 8	Gas.	10
Allwork.....2-G	14-28	1595	4	Own	4-4 1/2 x 6	GorK	3	Frisk.....A	12-20	800	4	Erld.	4-4 x 6	G, K	2-3	Plowman.....A	15-30	1295	4	Buda	4-4 1/2 x 6	G, K	3
*ARO 1921-22	3-6	385	4	Own	1-4 1/2 x 5	GorK	1	Frisk.....C	15-28	800	4	Beav.	4-4 1/2 x 6	G, K	3-4	Reliable.....	10-20	390	4	Own	2-6 x 7	Ker.	2
Aultman-T.....	15-30	1900	4	Clim.	4-5 x 6 1/2	G, K	4	Grain Belt.....A	18-30	2150	4	Wauk.	4-4 1/2 x 6 1/2	G or K	4	Rex.....	12-25	1600	4	Wauk.	4-4 1/2 x 5 1/2	G or K	3
Aultman-T.....	22-45	2800	4	Own	4-5 1/2 x 8	G, K	6	Gray.....	20-36	1975	3	Wauk.	4-4 1/2 x 6 1/2	Gas.	4	Russell.....	12-21	1500	4	Own	4-4 1/2 x 5 1/2	G or K	2-3
Aultman-T.....	30-60	4000	4	Own	4-7 x 9	G, K, D	8-10	Gray.....	22-44	2165	3	Wauk.	4-5 x 6 1/2	Gas.	4-5	Russell.....	15-30	2200	4	Own	4-5 x 6 1/2	G or K	3-4
Automot. B-3	12-24	1250	4	Herc.	4-4 x 5 1/2	Gas.	2-3	Gt. Western St	20-30	1950	4	Beav.	4-4 1/2 x 6	K	4	Russell.....	20-35	3000	4	Own	4-5 1/2 x 7	G or K	4-5
Avery, SR. Cul.	5-10	400	4	Own	4-3 x 4	G, K	1	Hart-Parr.....20	20	765	4	Own	2-5 1/2 x 6 1/2	K, D	2	Russell.....	30-60	5000	4	Own	4-8 x 10	G or K	8-10
Avery, Cult-C	5-10	400	4	Own	4-3 x 4	G, K	1	Hart-Parr.....30	30	895	4	Own	2-6 1/2 x 7	K, D	3	Samson.....M	10-20	445	4	Own	4-4 x 5 1/2	G, K	2
Avery.....B	5-10	400	4	Own	4-3 x 4	G, K	1	Heider.....D	9-16	870	4	Wauk.	4-4 1/2 x 6 1/2	G, K	2	Sandusky.....J	10-20	1250	4	Own	4-4 1/2 x 5 1/2	G, K, D	2
Avery.....C	8-16	400	4	Own	2-5 1/2 x 6	G, K, D	2-3	Heider.....C	12-20	995	4	Wauk.	4-4 1/2 x 6 1/2	G, K	3	Sandusky.....E	15-35	1750	4	Own	4-5 x 6 1/2	G, K, D	4
Avery.....D	12-20	400	4	Own	4-4 1/2 x 6	G, K, D	3-4	Heider.....Cult	5-10	800	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Shelby.....D	15-30	180	3	B & S	1-2 1/2 x 2 1/2	G	1
Avery.....E	12-25	400	4	Own	2-6 1/2 x 7	G, K, D	3-4	Huber Light 4	12-25	985	4	Wauk.	4-4 1/2 x 5 1/2	G or K	3	Shelby.....C	9-18	180	3	Wauk.	4-3 1/2 x 5 1/2	G or K	3
Avery.....F	14-28	400	4	Own	4-4 1/2 x 6	G, K, D	4-5	Huber Super 4	15-30	1885	4	Midw.	4-4 1/2 x 6	Gas.	3	Steady Pull.....	12-24	1485	4	Own	4-4 x 5	Gas.	3
Avery.....G	18-36	400	4	Own	4-5 1/2 x 6	G, K, D	4-5	Illinois.....C	15-30	1500	4	Clim.	4-5 x 6 1/2	G, K	4	Tioga.....3	18-32	400	4	Wise.	4-4 1/2 x 6	Gas.	3-4
Avery.....H	25-51	400	4	Own	4-6 1/2 x 7	G, K, D	5-6	Indiana.....F	5-10	665	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2	Toro Cultivator	6	750	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2
Avery.....I	45-65	400	4	Own	4-7 1/2 x 8	G, K, D	9-10	International.....	8-16	1670	4	Own	4-4 1/2 x 5	G, K, D	2	Toro Tractor 22	6-10	495	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2
Bates Mule, H	15-25	400	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Internat. Titan	10-20	1700	4	Own	2-6 1/2 x 8	G, K, D	3	Townsend.....	10-20	800	2	Own	4-6 1/2 x 7	Ker.	2-3
Bates Mule, F	18-25	400	4	*2 Midw.	4-4 1/2 x 6	Gas.	3	International.....	15-30	1750	4	Own	4-5 1/2 x 8	G, K, D	4	Townsend.....	15-30	1350	2	Own	4-7 x 8	Ker.	3-4
Bates Mule G	25-35	4250	4	*2 Ste.	4-4 1/2 x 6 1/2	Gas.	4	J-T.....N	25-40	3000	2	Clim.	4-5 x 6 1/2	G, K, D	3-4	Townsend.....	25-50	2500	2	Own	4-8 1/2 x 10	Ker.	4-8
Beauman.....G	2-4	240	4	Own	1-3 1/2 x 4 1/2	Gas.	4	*Kinkade.....	1 1/2	190	1	Own	1-3 x 3	Gas.	1	Traction Motor	40-50	400	4	Own	8-3 1/2 x 5	Gas.	4-5
Best.....	30	400	4	Own	4-4 1/2 x 6 1/2	G, K, D	4	La Crosse.....	12-24	985	2	Own	2-6 x 7	G, K	3	Traylor.....TB	6-12	500	4	LeR.	4-6 1/2 x 4 1/2	Gas.	1-2
Best.....	60	400	4	*2 Own	4-6 1/2 x 6 1/2	G, K, D	8-9	Lauson.....21	12-25	1235	4	Midw.	4-4 1/2 x 6 1/2	G or K	3-4	Trundar.....10	25-40	3750	2	Wauk.	4-6 x 8 1/2	G or K	4
Boring.....	5-10	395	4	LeR.	4-3 1/2 x 4 1/2	G	2	Lauson Road	15-30	2000	4	Beav.	4-4 1/2 x 6	K	3-4	Twin City.....	12-29	1200	4	Own	4-4 1/2 x 6	G, K	3
Boring.....1921	15-30	1850	3	Wauk.	4-4 1/2 x 6 1/2	GorK	3-4	Leader.....B	12-18	685	4	Own	2-6 x 8 1/2	G, K, D	2-3	Twin City.....	20-35	2750	4	Own	4-4 1/2 x 6 1/2	G, K	5-6
Burn-Oil, 1922	15-30	1395	4	Own	2-6 1/2 x 7	Ker.	5-4	Leader.....N	16-32	1725	4	Clim.	4-5 x 6 1/2	Gas.	3-4	Twin City.....	40-65	4750	4	Own	4-7 1/2 x 9	G, K	8-10
Capital.....	15-30	1000	2	Own	4-4 1/2 x 6	Gas.	3	*Leader.....GU	18-35	2150	2	Clim.	4-5 x 6 1/2	G, K	3-4	Uncle Sam C20	12-20	195	4	Weid.	4-4 x 5 1/2	G	2-3
Case.....	12-20	1050	4	Own	4-4 1/2 x 5	G, K, D	2	Lim.....HJ	40-4500	4500	4	Cont.	4-4 1/2 x 5 1/2	Gas.	4	Uncle Sam B19	20-30	1985	4	Beav.	4-4 1/2 x 6	G or K	3-4
Case.....	12-20	1050	4	Own	4-4 1/2 x 5	G, K, D	2	Lim.....W	60	5000	4	Wauk.	4-5 x 6 1/2	Gas.	6	Uncle Sam D21	20-30	1895	4	Beav.	4-4 1/2 x 6	G or K	3-4
Case.....	15-27	1320	4	Own	4-4 1/2 x 6	G, K, D	3-4	Little Giant, B	16-22	2200	4	Own	4-4 1/2 x 5	K	4	Utilitor.....501	2 1/2-4	295	4	Own	1-3 1/2 x 4 1/2	G	1
Case.....	22-40	2550	4	Own	4-5 1/2 x 6 1/2	G, K, D	4-5	Little Giant, A	26-35	3300	4	Own	1-5 1/2 x 6	K	6	Utilitor.....501A	2 1/2-4	340	4	Own	1-3 1/2 x 4 1/2	G	1
Caterpillar T35	40-72	5200	4	Own	7 x 8	G, K, D	8-10	Lombard, 1922	85-150	8950	2	Wise.	6-5 1/2 x 6 1/2	Gas.	10	Wallis.....K	15-25	400	4	Own	4-4 1/2 x 5 1/2	G, K	3
Caterpillar 5T	25	400	4	Own	4-4 x 5 1/2	Gas.	3	Lombard, 1922	50	5300	2	Wise.	4-4 1/2 x 6 1/2	Gas.	1-10	Waterloo.....N	12-25	675	4	Own	2-6 1/2 x 7	Ker.	3
Caterpillar 10T	40	400	4	Own	4-6 1/2 x 7	Gas.	6	MerryGar 1922	2	210	2	Ervin	1-2 1/2 x 2 1/2	Gas.	1	Wetmore 21-22	12-25	1185	4	Wauk.	4-4 x 5 1/2	G, K	3
Centaur.....	5-2 1/2	345	2	N Way	2-4 1/2 x 4 1/2	GorK	1	Minne.....All-P	12-25	800	4	Own	4-4 1/2 x 7	G or K	3	Whitney.....D	9-18	595	4	Own	2-5 1/2 x 6 1/2	Gas.	2
Chicago.....	40	2500	4	Own	4-4 1/2 x 6	Gas.	4	Minne, Med.D	22-44	2650	4	Own	4-6 x 7	G or K	5-6	Wichita.....T	15-30	2000	4	Beav.	4-4 1/2 x 6	G, K, D	3-4
Cletrac.....F	9-16	595	2	Own	4-3 1/2 x 4 1/2	G, K, D	2	Mohawk, 1922	8-16	650	2	Light	4-3 1/2 x 4 1/2	K or G	1-2	Wisconsin.....E	16-30	1850	4	Wauk.	4-5 x 6 1/2	G or K	3
Cletrac.....W	12-20	1345	2	Own	4-4 x 5 1/2	G, K, D	2-3	Moline Univ D	9-18	650	2	Wauk.	4-3 1/2 x 5	G, K	2-3	Wisconsin.....F	20-40	2050	4	Wauk.	4-5 x 6 1/2	G or K	3
Dakota.....4	15-27	1500	3	Dom.	4-4 1/2 x 6	Gas.	3	Moline Orch.	9-18	650	2	Own	4-3 1/2 x 5	G, K	2-3	Wisconsin.....H	22-40	2550	4	Clim.	4-5 1/2 x 7	G or K	4-6
Depue.....A	20-30	2500	4	Buda	4-4 1/2 x 6	Gas.	3	Motor Macult.	1 1/2	195	2	Own	1-2 1/2 x 3 1/2	Gas.	1	Yuba.....12-20	12-20	2400	2	Wisc.	4-4 1/2 x 6 1/2	G, K, D	3
Dill.....D	20	2380	4	Cont.	4-4 1/2 x 5 1/2	Gas.	3	NB.....1	3-6	425	4	Own	2-3 1/2 x 4	Gas.	1	Yuba.....15-25	15-25	2750	2	Wisc.	4-4 1/2 x 6	G, K, D	3
Dodge.....R.W.	20	2980	4	Midw.	4-4 1/2 x 6	Gas.	3	Nichols-Shep.	20-42	2650	4	Own	8 x 10	G or K	3-6	Yuba.....20-35	20-35	3900	2	Wisc.	4-5 1/2 x 7	G, K, D	4
Do-It-All.....A	3-6	495	1	Own	1-4 1/2 x 5	Gas.	1	Nichols-Shep.	25-60	3000	4	Own	9 x 12	G or K	4-7	Yuba.....25-40	25-40	4250	2	Wisc.	4-5 1/2 x 7	G, K, D	4
Eagle.....F	12-22	1500	3	Dom.	4-4 1/2 x 6	Gas.	3	Nichols-Shep.	35-70	3650	4	Own	10 1/2 x 14	G or K	8-10	Yuba.....35-40	35-40	4750	2	Yuba	4-6 1/2 x 7	D	..
Eagle.....H	16-30	1500	3	Dom.	4-4 1/2 x 6	Gas.	3	Nilson Senior..	20-40	1975	5	Wauk.	4-5 x 6 1/2	G, K	4	Zelle.....	12-25	400	4	Buda	4-4 1/2 x 5 1/2	G or K	3
E-8.....AA	12-20	1095	4	Own	4-4 1/2 x 5	Gas.	2	Oil Pull.....K	12-20	400	4	Own	2-6 x 8	K, D	3	ABBREVIATIONS:	G—Gasoline. K—Kerosene. D—Distillate. Flow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Maker: Beav.—Beaver. B & S—Briggs & Stratton. Clim.—Climax. Cont.—Continental. Dom.—Domas. Evinn.—Evinrude. Herc.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Ste.—Stearns. Wauk.—Waukesha. Weid.—Weidely. Win.—Wisconsin. Wauk.—Crawley type. All others are wheel type. *Price includes plows. †Track Runner. ‡Industrial Tractor. §Garden Tractor.						
Farquhar.....	15-25	400	4	Buda	4-4 1/2 x 6	G, K, D	3-4	Oil Pull.....H	16-30	400	4	Own	2-7 x 8 1/2	K, D	4								
Farquhar.....	18-35	400	4	Own	4-6 x 8	G, K, D	4-5	Oil Pull.....K	20-40	400	4	Own	2-8 x 10	K, D	5-6								
Farquhar.....	18-35	400	4	Own	4-7 x 8	G, K, D	6-7	Oil Pull.....E	30-60	400	4	Own	2-10 x 12	K, D	8-10								
Farquhar.....	20-35	1850	4	Clim.	4-5 x 6 1/2	Gas.	3-4																



CABRIOLE PRICE, \$1395, INCLUDES TRUNK, BUMPER, MOTOMETER AND COMPLETE EQUIPMENT

Retail sales prove EARL *Cabriole* is right in price, design, quality

In spite of price cuts and turmoil in the trade, every day adds new evidence of the hit which the Earl *Cabriole* is making with the men who sell motor cars and the men and women who buy and drive them.

I underline women for the reason that latest reports from Earl distributors and dealers make it clear that hundreds of women are finding in the *Cabriole* the exact kind and quality of motor car they have been looking for.

They recognize that the Earl *Cabriole* at \$1395 is not only the greatest closed car value ever offered, but also the only *right price* car which meets all their important requirements.

Ease of control, for instance. The discriminating woman driver loses all interest in a car unless she feels at home behind the wheel, can drive without fatigue and finds that transmission, clutch and brakes are accessible and smooth in handling.

The Earl *Cabriole* gives her all this and much more. It gives her flexible power without extravagance, instant pick-up, speed for any emergency, intimate yet uncrowded comfort for four passengers. And it gives her dependable, weatherproof transportation and personal independence 365 days in the year.

Write me today for the facts about the great Earl line. It's the *right line*, at the *right price*, with the *right dealer discount*.

Chas. Earl
President and General Manager

Distinctive Cabriole Features

Low sweeping lines give the Earl *Cabriole* its special distinction. Its over-all length is 14 feet, less one inch; its over-all height is only 74 inches. Head room is ample—from seats to top lining, 37 inches. The front tonneau is 53 inches long. The rear seat is 45½ inches wide, seating three average passengers without crowding. Combined with 56-inch rear springs and a rigid channel frame 7 inches deep, this roominess assures unusual riding comfort.

Earl-built units are responsible for the remarkable economy and road efficiency of the Earl *Cabriole*. The long-stroke, four-cylinder, L-head motor, with a piston displacement of only 195 inches, develops 37.5 horsepower at 2400 r. p. m. The crankshaft is three bearing, balanced statically and dynamically. Ignition is by U. S. L. battery. Starter and generator are Auto-Lite.

Ease of control is assured by the Earl-built selective transmission and special steering gear—both uncommonly smooth in operation. Front and rear axles are Earl-forged, the latter semi-floating. Tires are 32x4 cord. Standard equipment includes drum-type head lamps with non-glare lenses, ignition and dimmer switch at left of steering column, speedometer, horn and all usual accessories.

Touring Car	\$1095
Cabriole	1395
Custom Roadster	1485
Brougham	1795
Sedan	1795

Prices f. o. b. Jackson

EARL MOTORS, INC.
JACKSON MICHIGAN



Full information about the *Cabriole* and four other striking Earl models on request. Wire or write to Jackson today for the facts about your territory and the opportunity the Earl franchise gives to build a permanent business

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	
Ace.....	F	G-B	4-3 1/2x5	114	32x4	\$1295	\$1295	.....	\$2295	Lincoln.....	Own.	8-3 1/2x5	130	33x5	.....	.....	.....	\$3900	.....
Ace.....	L	H-S	6-3 1/2x5	117	32x4	2260	2260	.....	3680	Lincoln.....	Own.	8-3 1/2x5	136	33x5	\$3800	b3800	\$3800	\$4900	.....
Ace.....	C	Cont.	6-3 1/2x5 1/2	123	32x4 1/2	2975	2975	.....	4500	Locomobile.....	48	6-4 1/2x5 1/2	142	35x5	.....	b7600	7600	10500	11000	
Ambassador.....	R	Cont.	6-3 1/2x5 1/2	136	33x5	.....	b1500	\$1500	6500	Maibehm.....	B	Own.	6-3 1/2x4 1/2	116	32x4	1395	1395	b1495	2165	2165
American.....	C	Il-S.	6-3 1/2x5	127	33x4 1/2	b1095	1850	1925	.....	Marmen.....	34	Own.	6-3 1/2x5 1/2	136	32x4 1/2	3385	b3185	3185	3685	4385
Anderson.....	Aluminum	6	Cont.	6-3 1/2x4 1/2	114	32x4	.....	1195	.....	Maxwell.....	.....	Own.	4-3 1/2x4 1/2	109	31x4	885	885	.....	1385	1485
Anderson.....	Series 40	Cont.	6-3 1/2x4 1/2	120	33x4	2195	1650	1795	\$2450	McFarlan.....	1922	Own.	6-4 1/2x6	140	33x5	6300	b6300	6300	7500	7500
Apperson.....	8-21-S	Own.	8-3 1/2x5	130	34x4 1/2	.....	2620	2645	3625	Mercer.....	Series 5	Own.	4-3 1/2x6 1/2	132	32x4 1/2	3950	b3950	c3950	4850	5250
Auburn.....	6-51	Cont.	6-3 1/2x4 1/2	121	32x4	1575	1575	1615	2395	Merit.....	.....	Cont.	6-3 1/2x4 1/2	119	32x4	1895	1895	.....	.....	.....
Auburn.....	6-51	Cont.	6-3 1/2x4 1/2	121	32x4 1/2	.....	n2195	.....	.....	Mitchell.....	F-50	Own.	6-3 1/2x5	120	33x4	a1490	1490	b1600	2050	2275
Bay State.....	Cont.	6-3 1/2x4 1/2	121	32x4	1800	1800	.....	2400	2500	Mitchell.....	F-50	Own.	6-3 1/2x5	127	32x4 1/2	.....	.....	1600	.....	.....
Bel.....	4-32	Il-S.	4-3 1/2x5	114	31x4	1695	1695	.....	.....	Monroe.....	1922-S-9	Own.	4-3 1/2x4 1/2	115	32x3 1/2	950	950	.....	.....	.....
Bel.....	6-50	Il-S.	6-3 1/2x5	124	32x4	1545	1545	.....	.....	Moore.....	6-40	Cont.	6-3 1/2x4 1/2	115	31x4	1295	1295	.....	1695	.....
Biddle.....	B1 & B5	Bulch.	4-3 1/2x5 1/2	121	32x4	2950	b2950	.....	3950	Moore.....	6-50	Cont.	6-3 1/2x4 1/2	128	33x4 1/2	1785	1785	2785	.....	.....
Brewster.....	91	Own.	4-4 1/2x5 1/2	125	32x4 1/2	5000	5000	.....	7000	Nash.....	691-96-97	Own.	6-3 1/2x5	121	33x4	1210	1240	b1395n	.....	.....
Buick.....	1922-31-5-6-7-38	Own.	4-3 1/2x4 1/2	109	31x4	865	885	u725	1175	Nash.....	692-94-95	Own.	6-3 1/2x5	127	33x4 1/2	.....	1390	b1890	2190	.....
Buick.....	1922-41-4-5-47	Own.	6-3 1/2x4 1/2	118	33x4 1/2	1175	1195	u775	1035e	Nash Four.....	41-4	Own.	4-3 1/2x5	112	33x4	915	935	.....	a1385	1545
Buick.....	1922-48-9-50-4-55	Own.	6-3 1/2x4 1/2	124	34x4 1/2	n1625v	n1675v	1435	1895	National.....	BB	Own.	6-3 1/2x5 1/2	130	32x4 1/2	a2475	b2475	2375	3725	3825
Cadillac.....	61	Own.	8-3 1/2x5 1/2	132	33x5	3100	3150	3150	b3875	Noma.....	3C	Cont.	6-3 1/2x4 1/2	128	32x4 1/2	2000	b2100	c2200	.....	3200
Cadillac.....	X	Cont.	6-3 1/2x4 1/2	129	32x4 1/2	1750	1790	.....	2550	Noma.....	1D	Bea...	6-3 1/2x5 1/2	128	32x4 1/2	3000	b3100	c3200	.....	5500
Cadillac.....	W	Cont.	6-3 1/2x4 1/2	129	32x4 1/2	.....	2200	2250	3250	Norwalk.....	430-KS	Lyc...	4-3 1/2x5	110	32x3 1/2	.....	1035	.....	.....	.....
Chalmers.....	1922	Own.	6-3 1/2x4 1/2	117	32x4	1185	1185	.....	1595	Oakland.....	6-44	Own.	6-2 1/2x4 1/2	115	32x4	975	995	b1165n	b1445	1545
Chalmers.....	1922	Own.	6-3 1/2x4 1/2	122	32x4	.....	1345	.....	.....	Ogen.....	6 T De Luxe	Cont.	6-3 1/2x5 1/2	134	33x5	b3750	3750	3850	4500	4800
Chandler.....	Superior	Own.	4-3 1/2x4	102	30x3 1/2	510	525	u425	b840	Oldsmobile.....	43-A	Own.	4-3 1/2x5 1/2	115	32x4	1145	1145	b1265	1645	1795
Chrysler.....	Superior	Own.	4-3 1/2x4	102	30x3 1/2	510	525	u425	b840	Oldsmobile.....	46	Own.	8-2 1/2x4 1/2	122	32x4 1/2	.....	b1735	1735	.....	2635
Chevrolet.....	FB	Own.	4-5 1/2x5 1/2	110	32x4	885	885	.....	1325	Oldsmobile.....	47	Own.	8-2 1/2x4 1/2	115	32x4	1595	1595	b1595	2145	2295
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Overland.....	4	Own.	4-3 1/2x4	100	30x3 1/2	550	550	.....	850	895
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Packard.....	Single-Six	Own.	6-3 1/2x5	126	33x4 1/2	2485	2485	u2250	3175	3275
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Packard.....	Single-Six	Own.	6-3 1/2x5	133	33x4 1/2	.....	u2350	2685	.....	3525
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Packard.....	Twin Six	Own.	12-3 x5	136	35x5	3850	3850	3850	5240	5400
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Paige.....	6-44	Own.	6-3 1/2x5	119	32x4	1465	1465	u2190	1995	2245
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Paige.....	6-66	Cont.	6-3 1/2x5	131	33x4 1/2	a2495	n2245	2195	3100	3155
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Patterson.....	22-6-52	Cont.	6-3 1/2x4 1/2	120	32x4 1/2	.....	1550	1585	2595	2595
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pearless.....	56-S-7	Own.	8-3 1/2x5	125	34x4 1/2	.....	b2790	2790	3500	3760
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	b5250	5250	6800	7000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5	112	32x4	1085	1095	n1260	1495	Pierce-Arrow.....	.....	Own.	6-4 x5 1/2	138	33x5	5250	5250	2000	2950	3000
Chevrolet.....	41	Own.	8-3 1/2x5</																	